U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-258 154

Guide for Compiling a Comprehensive Emission Inventory

Environmental Protection Agency, Research Triangle Park, N C

Mar 73

272053

PB 258 154

GUIDE FOR COMPILING A COMPREHENSIVE EMISSION INVENTORY

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

U.S. ENVIRONMENTAL PROTECTION AGENCY

BIBLIOGRAPHIC DATA SHEET

1. Report No. APTD-1135

2.

3. Recipient's Accession No. PB-258 154

4. Title and Subtitle
Guide for Compiling a Comprehensive Emission Inventory

5. Report Date Mar 73

6.

7. Author(s)

8. Performing Organization Rept. No.

9. Performing Organization Name and Address
Environmental Protection Agency
Research Triangle Park, North Carolina
Office of Air and Water Program

10. Project/Task/Work Unit No.

11. Contract/Grant No.

12. Sponsoring Organization Name and Address

13. Type of Report & Period Covered

14.

15. Supplementary Notes

16. Abstracts
Detailed procedures are given for obtaining and codifying information about air pollutant emissions from stationary and mobile sources. The system has been developed specifically for use by state and local air pollution control agencies. Because of the large amount of information that must be collected, the data must be handled by ADP means. A uniform coding system for the data is encouraged in order that the information from one region may be compared with that from another. Detailed procedures are given concerning the information to be gathered from each source, the methods to be used to gather the information, the codes to be used to simplify the information on standard coding forms, the geographical and population information needed about the area of interest, the apportionment techniques and emission factors needed, and the methods of displaying the data. The relation of state and local emission inventory systems to the EPA NED system is also explained.

17. Key Words and Document Analysis. 17a. Descriptors

*Air pollution,
*Information systems,
*Exhaust emissions,
*Combustion products,
*Manuals,

Data acquisition,
Coding,
Systems engineering,
State government,
Local government,
Control,
Organizations,
Data processing,
Computer programming,
Inventories,
Comparison,
Planning,
Sampling.

17b. Identifiers/Open-Ended Terms

Stationary sources,
National emissions data system.

17c. COSATI Field/Group 13 B

18. Availability Statement
National Technical Information Service
Springfield, Virginia 22161

19. Security Class (This Report) UNCLASSIFIED

20. Security Class (This Page) UNCLASSIFIED

21. No. of Pages 218p

22. Price 7.75/3.00

GUIDE FOR COMPILING A COMPREHENSIVE EMISSION INVENTORY

(Revised)

MONITORING AND DATA ANALYSIS DIVISION

Environmental Protection Agency
Library Systems Branch, Room 2903
401 M Street, S.W.
Washington, D.C. 20460

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF AIR AND WATER PROGRAMS
OFFICE OF AIR QUALITY PLANNING AND STANDARDS
RESEARCH TRIANGLE PARK, NORTH CAROLINA
MARCH 1973

1a

The APTD (Air Pollution Technical Data) series of reports is issued by the Office of Air Quality Planning and Standards, Office of Air and Water Programs, Environmental Protection Agency, to report technical data of interest to a limited number of readers. Copies of APTD reports are available free of charge to Federal employees, current contractors and grantees, and non-profit organizations - as supplies permit - from the Air Pollution Technical Information Center, Environmental Protection Agency, Research Triangle Park, North Carolina 27711 or may be obtained, for a nominal cost, from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22151.

Publication No. APTD-1135

ACKNOWLEDGMENTS

This manual was prepared to assist state and local air pollution control agencies in compiling their emission inventories. Many persons assisted in its preparation. The following individuals are especially acknowledged: D. H. Ackerson, P. J. Bierbaum, J. Bosch, J. H. Cavender, M. J. Gedgaudas, J. R. Hammerle, D. S. Kircher, A. A. MacQueen, C. O. Mann, D. V. Mason, J. B. Mersch, J. H. Southerland, and E. F. Tison.

CONTENTS

LIST OF FIGURES . . . vii

LIST OF TABLES . . . vii

ABSTRACT . . . ix

1. INTRODUCTION . . . 1-1
   - DESCRIPTION OF AIR POLLUTANT EMISSION INVENTORY . . . 1-1
   - USES OF EMISSION INVENTORY . . . 1-1
   - PURPOSE OF THIS MANUAL . . . 1-2

2. UNIFORM SOURCE INVENTORY . . . 2-1
   - NEED FOR UNIFORM SOURCE INVENTORY . . . 2-1
   - COMPUTERIZED SYSTEM . . . 2-1
   - DATA FILES . . . 2-1
   - IDENTIFICATION FILES . . . 2-3
     - Geographical Identification Files . . . 2-3
     - Use of UTM System . . . 2-4
     - Air Quality Control Regions . . . 2-6
     - Population Data File . . . 2-6
   - AUTOMATIC DATA PROCESSING (ADP) SOFTWARE . . . 2-8
   - UPDATING DATA FILES . . . 2-9
   - REFERENCES . . . 2-9

3. EMISSION FACTORS . . . 3-1
   - EMISSION FACTORS DEFINED . . . 3-1
   - USE OF EMISSION FACTORS . . . 3-2
   - CONTROL EQUIPMENT . . . 3-2
   - SOURCE CLASSIFICATION CODE . . . 3-3
   - QUALITY RATINGS OF EMISSION FACTORS . . . 3-3
   - REFERENCE . . . 3-3

4. POINT SOURCE CODING . . . 4-1
   - DESCRIPTION OF POINT SOURCE CODING FORM . . . 4-1
   - INSTRUCTIONS FOR COMPLETING POINT SOURCE CODING FORM . . . 4-3
   - IDENTIFICATION AND LOCATION OF POINT SOURCES . . . 4-5
   - STACK PARAMETERS . . . 4-7
   - CONTROL EQUIPMENT IDENTIFICATION CODE . . . 4-11
   - OPERATING INFORMATION AND EMISSION ESTIMATES . . . 4-13
   - COMPLIANCE ANALYSIS . . . 4-16
   - FUEL, PROCESS, OR SOLID-WASTE INFORMATION . . . 4-18
   - SUPPLEMENTARY INSTRUCTIONS . . . 4-21
   - NEDS VARIABLE DATA SUBSYSTEM . . . 4-23

ERRATA FOR
GUIDE FOR COMPILING A COMPREHENSIVE EMISSION INVENTORY

Page 4-5, section 4.3, subsection 4, line 1: change "This column" to read "This field"

Page 4-6, section 4.3, subsection 7, line 2: change "are recorded here" to read "must be recorded here"

Page 4-6, section 4.3, subsection 8, line 1: change "This column" to read "This field"

Page 4-6, section 4.3, subsection 9, lines 2-3: change "this column." to read "this field."

Page 4-8, section 4.4, Card 2, spaces 28-32: change "XXX.X" to read "XXXX.X"

Page 4-8, section 4.4, subsection 2, line 2: change "should be entered here. This column" to read "must be entered here. This field"

Page 4-8, section 4.4, subsection 4, line 1: change "This column" to read "This field"

Page 4-10, section 4.4, subsection 8, line 6: change "50 °F" to read "77 °F"

Page 4-10, section 4.4, subsection 10, lines 1 and 4: change "this column" to read "this field"

Page 4-10, section 4.4, para. 4, line 9: change "a zero in column 54." to read "zeros in this field."

Page 4-13, section 4.5, subsection 4, line 7: change "a zero in the column" to read "zeros in this field"

Page 4-15, section 4.6, subsection 2, line 7: change "appropriate column." to read "appropriate columns."

Page 4-15, section 4.6, subsection 3, line 3: change "this column" to read "this field"

Page 4-15, section 4.6, subsection 4, line 3: add "Emissions from fuel used in an industrial process (e.g., metal melting and processes using kilns and dryers) should be estimated from equivalent industrial boiler factors and added to the process emissions; the totals should then be entered in the appropriate emissions estimates columns. Record in 'comments' that boiler factors are used."

Page 4-15, section 4.6, subsection 5, line 5: delete "(if emissions are negligible)"

Page 4-15, section 4.6, subsection 5, line 10: change to read "3 Emissions calculated using emission factors from Compilation of Air Pollutant Emission Factors, AP-42 (Revised 1973). Use if emissions estimates are zero when EPA factors are used"

Page 4-15, section 4.6, subsection 5: add "5 Emissions calculated using a special emission factor that differs from the official EPA factor"

Page 4-15, section 4.6, subsection 6, line 3: change "zero in this column." to read "zeros in this field."

Page 4-16, section 4.7, subsection 2.a: change "legislation" to read "regulations"

Page 4-19, section 4.8, Card 6, spaces 43-45: delete "code"

Page 4-20, section 4.8, subsection 6, line 1: change "This column" to read "This field"

Page 4-20, section 4.8, subsection 6, line 3: add "Enter zero for all solid waste processes." after "nonapplicability"

Page 4-22, section 4.9, subsection 5.b., line 5: change "Paragraph 4.2.10" to read "Paragraph 4.4.7"

Page 5-8, section 5.5.4, subsection 5.5.4.2.1, Step 2, line 11: change "dwelling unit per degree-days." to read "dwelling unit per degree-day."

Page 5-16, section 5.7.1, para. 2, lines 1-2: change "gasoline vehicle miles" to read "total vehicle miles"

Page 4-19, section 4.8, card 6 format table for spaces 33-39, under "Units": change (SCC)/yr to (SCC)/hr

REFERENCES 4-28
5. AREA SOURCE CODING 5-1
IDENTIFICATION OF AREA SOURCE 5-1
COUNTY INFORMATION 5-1
EMISSION ESTIMATES 5-3
FUEL DATA 5-3
STATIONARY SOURCE FUEL CONSUMPTION 5-4
Major Fuels 5-4
Minor Fuels 5-5
Estimating Area Source Fuel Consumption 5-6
Apportioning Fuel Consumption 5-7
Applying Fuel Consumption Apportionment Methods 5-12
SOLID WASTE DISPOSAL 5-14
MOTOR VEHICLE FUEL DATA 5-15
Gasoline-Powered Motor Vehicles 5-15
Diesel-Powered Motor Vehicles 5-17
Off-Highway Fuel Use 5-18
Railroads 5-19
Vessels 5-21
Aircraft 5-25
EVAPORATIVE LOSSES 5-27
Gasoline-Handling Losses 5-27
Dry Cleaning Losses 5-27
Surface-Coating and Miscellaneous Solvent-Use Operations 5-27
MISCELLANEOUS SOURCES 5-29
REFERENCES 5-33
6. TRACE-MATERIAL AND HAZARDOUS-POLLUTANT SOURCE CODING 6-1
DESCRIPTION OF TRACE-MATERIAL AND HAZARDOUS-POLLUTANT FILE 6-1
INSTRUCTIONS FOR COMPLETING TRACE-MATERIALS CODING FORM 6-1
7. DATA PRESENTATION 7-1
INTRODUCTION 7-1
APPORTIONING POPULATION DATA TO GRIDS 7-3
APPORTIONING TRANSPORTATION EMISSIONS TO GRIDS 7-9
Apportioning Vehicle Miles Traveled and Vehicle Emissions to Grids . 7-9
Apportioning Railroad Track and Railroad Emissions to Grids 7-16
Apportioning Vessel Emissions to Grids 7-17
APPORTIONING OF LOSSES FROM GASOLINE MARKETING TO GRIDS 7-18
APPORTIONING OF SOLID WASTE DISPOSAL TO GRIDS 7-18
APPORTIONING OF RESIDENTIAL FUEL SOURCES TO GRIDS 7-19
APPORTIONING OF COMMERCIAL AND INSTITUTIONAL SOURCES TO GRIDS 7-24
APPORTIONING OF MISCELLANEOUS SOURCES TO GRIDS 7-24

APPORTIONING OF POINT SOURCES TO GRIDS 7-24
TOTALING GRIDDED EMISSIONS 7-24
REFERENCES 7-26
8. DISPERSION MODELING 8-1
INTRODUCTION 8-1
USES OF DIFFUSION MODELS 8-1
EMISSION INVENTORY AND OTHER DATA NEEDED FOR MODELING 8-2
REFERENCES 8-3
9. QUESTIONNAIRES 9-1
GENERAL INFORMATION 9-1
10. EPA DATA SYSTEM FOR ATMOSPHERIC EMISSIONS 10-1
CONCEPT OF NEDS 10-1
POINT AND AREA SOURCE INVENTORIES FOR NEDS 10-2
EMISSION FACTORS FOR NEDS 10-3
DATA RETRIEVAL ACCESS FOR NEDS 10-3
Summaries 10-3
Sorting 10-4
Special Analysis 10-4
UPDATING AND MAINTENANCE FOR NEDS 10-4

APPENDIX A - COMPREHENSIVE EMISSION INVENTORY IDENTIFICATION CODES A-1
GEOGRAPHICAL IDENTIFICATION CODES A-1
State Identification Numbers A-3
Air Quality Control Region Identification Numbers A-4
SOURCE CLASSIFICATION CODES A-19
CONTROL EQUIPMENT IDENTIFICATION CODES A-36
IPP PROCESS IDENTIFICATION CODES A-37
TRACE ELEMENTS AND COMPOUNDS IDENTIFICATION CODES A-42
APPENDIX B - COMPREHENSIVE EMISSION INVENTORY CARD FORMATS B-1
POINT SOURCE CARD FORMAT B-1
AREA SOURCE CARD FORMAT B-7
TRACE MATERIALS/HAZARDOUS POLLUTANTS SOURCE CARD FORMAT B-13
SOURCE CLASSIFICATION CODE CARD FORMAT B-14
GEOGRAPHICAL CARD FORMAT B-16
APPENDIX C - POINT SOURCE DEFINITION C-1
APPENDIX D - EXAMPLE QUESTIONNAIRES D-1
EXAMPLE COVER LETTER D-1
INSTRUCTIONS FOR COMPLETING QUESTIONNAIRE D-1
AIR POLLUTANT EMISSIONS SURVEY D-4

CRUDE OIL DRILLING, NATURAL GAS, AND LPG FACILITIES D-6
CONCRETE BATCH PLANTS D-7
CONICAL BURNERS D-8
SAWMILLS D-9
PEANUT PROCESSING D-10
COTTON GINNING D-11
ASPHALT BATCH PLANTS D-12
GRAIN HANDLING D-13
PETROLEUM REFINING D-14

LIST OF FIGURES

Figure Page
2-1 Emission Inventory System Concept 2-2
2-2 UTM Grid Zones in the Contiguous United States 2-5
4-1 Point Source Coding Form 4-2
4-2 Variable Data Input Form 4-24
5-1 Area Source Coding Form 5-2
6-1 Trace Materials/Hazardous Pollutant Source Coding Form 6-2
7-1 Use of Pie Charts to Illustrate Relative Distribution of Pollutant Emissions from Various Sources 7-4
7-2 Grid Coordinate System Example 7-5
7-3 UTM Grid Overlay of Census Tract Map of One County 7-8
7-4 Grid Coordinate System for Example Study Area 7-10
7-5 Population Densities for Example Study Area 7-11
7-6 Point Source Locations for Example Study Area 7-25
7-7 Particulate Emission Densities from All Sources in Example Study Area . 7-28
7-8 Sulfur Oxides Emission Densities from All Sources in Example Study Area. 7-29
7-9 Carbon Monoxide Emission Densities from All Sources in Example Study Area 7-30
A-1 Environmental Protection Agency Regions A-2
A-2 Federal Air Quality Control Regions A-18

LIST OF TABLES

Table Page
5-1 Nationwide Average Solid Waste Disposed of by Incineration and Open Burning 5-14
5-2 Solvent-Use Estimates 5-28
5-3 Forest Fire Estimates 5-30
7-1 Average Vehicle Counts by Land Use 7-12
7-2 Average Vehicle Speeds by Route Class 7-13
7-3 Average Fuel Consumption for a Five-Room Residence 7-21

Table Page

7-4 Summary of Air Pollutant Emissions from All Sources in Example Study Area 7-27

ABSTRACT

Detailed procedures are given for obtaining and codifying information about air pollutant emissions from stationary and mobile sources. The system has been developed specifically for use by state and local air pollution control agencies. Because of the large amount of information that must be collected, the data must be handled by ADP means.

A uniform coding system for the data is encouraged in order that the information from one region may be compared with that from another. Detailed procedures are given concerning the information to be gathered from each source, the methods to be used to gather the information, the codes to be used to simplify the information on standard coding forms, the geographical and population information needed about the area of interest, the apportionment techniques and emission factors needed, and the methods of displaying the data. The relation of state and local emission inventory systems to the EPA NED system is also explained.

GUIDE FOR COMPILING A COMPREHENSIVE EMISSION INVENTORY

1. INTRODUCTION

1.1 DESCRIPTION OF AIR POLLUTANT EMISSION INVENTORY

Pollution of the atmospheric environment has come about as an undesired by-product of the technological advancement of modern society. It is imperative that man use the technology that he has developed to engineer the prevention of atmospheric emissions.

The initial step toward improving the air pollution situation is to define the problem areas. A primary requirement is determination of the sources and components of air pollution. Fundamentally, this requirement is provided for by the emission inventory, which answers the pressing questions regarding sources, pollutant types and quantities, and relative impact.

Identification of sources, pollutants, locations, and quantities of emissions, coupled with local meteorological and air quality data and information regarding air pollution effects, provides the basis for a plan of action for improvement of air quality. The emission inventory is therefore a vital element in the abatement of emissions and in subsequent improvements in air quality.

1.2 USES OF EMISSION INVENTORY

Because it defines the sources of air pollution relatively and quantitatively, the emission inventory is one of the most important planning tools available to an air pollution control agency. The inventory provides information concerning source emissions and defines the location, magnitude, frequency, duration, and relative contribution of these emissions. It can be used to measure past successes and to point to future requirements. An emission inventory can be used to design an air sampling network, to predict ambient air quality, to design, evaluate, or modify a control program, and, in conjunction with a permit or registration system, to provide up-to-date information on major sources of pollution.

The proper emission control strategy for a specific air pollution problem is dependent upon an adequate assessment of the nature and extent of the pollution in the region involved. This assessment includes a review of existing levels of pollutants, the sources and their emissions, the techniques available for their control, and the probable increase in source emissions resulting from urban and economic growth. The emission inventory indicates the major contributors (motor vehicle, industrial, etc.), and this information, in turn, directs the thrust of control efforts. After the control strategies have been developed, they can be tested with the aid of a diffusion simulation model or other systematic, quantitative procedures to determine which strategies are capable of bringing about acceptable air quality as defined by national or state ambient air quality standards.

If the emission inventory is updated annually, a decrease in emissions should be reflected over a period of years. This decrease would then be a measure of the effectiveness and success of the control program and could be used to indicate areas where program modification would be useful.

Likewise, in the design of an air sampling network, it is important to get maximum return in usable data for the manpower and funds invested. Information concerning the location of sources and quantities of emissions in a region may be used to indicate where the highest pollutant concentrations probably exist. This knowledge will assist the agency in locating elements of the sampling network. Samplers are normally concentrated in areas of greatest emissions. In the event that a single source is believed to be primarily responsible for degraded air quality, the sampling network may be oriented in such a way that evidence of the impact of the emissions from that particular source may be obtained.

The emission inventory may be used with sufficient supporting meteorological data to predict ambient air quality for a given locality. From emission density maps, areas with high pollutant releases can be located. A more sophisticated method of predicting air quality is diffusion simulation modeling. Included among the models in widespread use are the Air Quality Display Model (AQDM) and the Implementation Planning Program (IPP). Although the AQDM and IPP are relatively simple to use, the accuracy of results is very dependent upon the degree to which the input data represent the physical situation within the area of interest.

1.3 PURPOSE OF THIS MANUAL

The specific purpose of this manual is to describe methods of obtaining emission inventory data and of presenting the information. Automatic data processing, charts, and maps are discussed as presentation techniques, and a step-by-step description of data acquisition is provided. As more information becomes available on emission inventory techniques and as specific methodology becomes more sophisticated, updated sections of this manual will be published as supplements available from the Air Pollution Technical Information Center, EPA. Any suggestions on specification of air pollutant emission inventory details should be directed to the Chief of the National Source Inventory Section, AQMB, ATD, SSPCP, OAP, Research Triangle Park, North Carolina 27711.

2. UNIFORM SOURCE INVENTORY

2.1 NEED FOR UNIFORM SOURCE INVENTORY

Much detailed information is needed about each source of pollutants in a selected locale before an emission inventory can be computed for that area. There are several ways in which the information about each source can be collected and codified. If, however, the data from one area are to be compared with those from another, it is necessary that all the information about all the sources conform to certain conventions.

Thus, common weight units, volume units, area units, grid coordinates, etc., must be used by all the data collectors. Another reason for standardizing data recording is to facilitate automatic data processing (ADP), which will be necessary because of the enormous amount of data that will be amassed from the large number of sources nationwide.

2.2 COMPUTERIZED SYSTEM

The concept of the computerized system is shown in Figure 2-1; the data storage and identification files are shown on the left side of the diagram, and the ADP operations are indicated on the right. The system will store data for all point and area (county) sources of emissions using the identification codes listed in Appendix A, and the formats shown in Appendix B; these data will be updated periodically.

2.3 DATA FILES

The following files are used for data storage:

1. Point source file - all source information on each point source, including Federal facilities.
2. Area source file - all source information on each area (county) source.
3. Hazardous pollutants source file - all source information on each emitter of hazardous or potentially hazardous trace elements or compounds. (Emitters meeting the requirement of a defined point source also are listed in the point source file.)

Because all emission factor information is stored separately in the emission factor file, changes can be made, at any time, in the emission factor file (containing about 900 cards) without modification of the source files (containing many

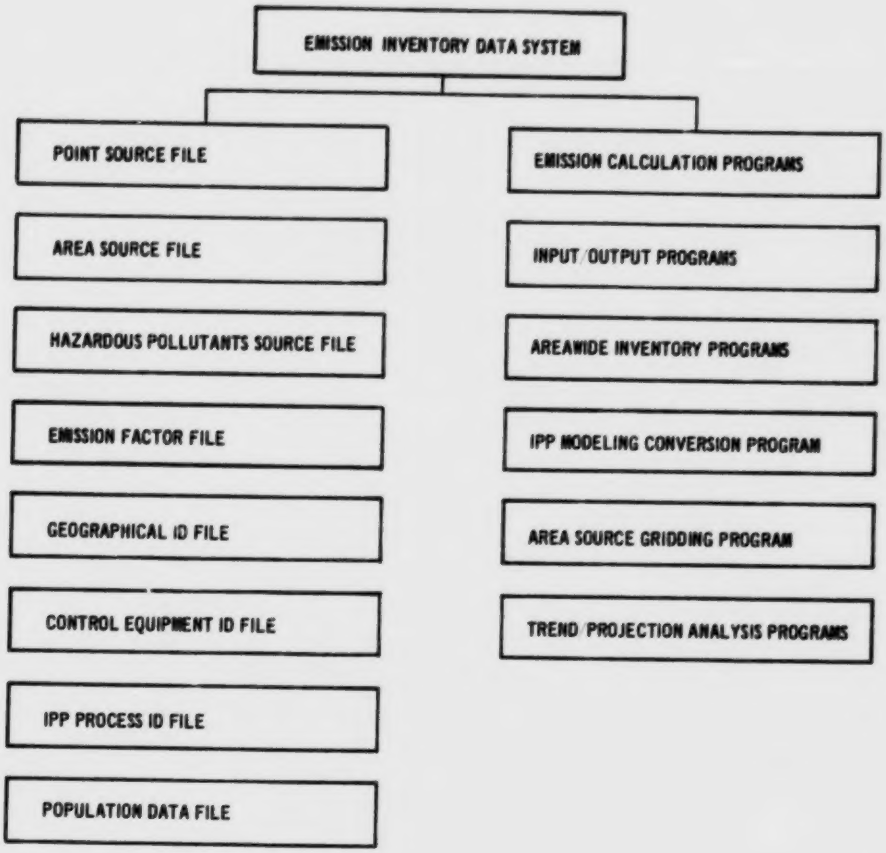

EMISSION INVENTORY DATA SYSTEM
POINT SOURCE FILE
AREA SOURCE FILE
HAZARDOUS POLLUTANTS SOURCE FILE
EMISSION FACTOR FILE
GEOGRAPHICAL ID FILE
CONTROL EQUIPMENT ID FILE
IPP PROCESS ID FILE
POPULATION DATA FILE
EMISSION CALCULATION PROGRAMS
INPUT/OUTPUT PROGRAMS
AREAWIDE INVENTORY PROGRAMS
IPP MODELING CONVERSION PROGRAM
AREA SOURCE GRIDDING PROGRAM
TREND/PROJECTION ANALYSIS PROGRAMS

Figure 2-1. Emission inventory system concept.

thousands). The formats for storage in the source and emission factor files are given in Appendix B, Sections 1, 2, and 3, and the Source Classification Codes (SCC's) for emission factors and units are given in Appendix A, Section 2.

2.4 IDENTIFICATION FILES

Additional data required for identification are stored in the following files:

1. Geographical identification file - all Federal regional offices, state, AQCR (Air Quality Control Region), and county names and identification numbers.
2. Control equipment identification file - all control equipment names and identification numbers.
3. IPP process identification file - all identification numbers as required in the inventory to be used in IPP modeling programs.

The formats for files 1 and 2 are given in Appendix B, Sections 4 and 5, and the actual identification numbers for files 1, 2, and 3 appear in Appendix A, Sections 1, 3, and 4.

Both projection and trend analyses require the use of extensive population data and associated information on housing, etc. If a state desires to use these analyses, the necessary information will be stored in the OAP data file on population.

2.4.1 Geographical Identification File

For the emission inventory to be used properly, emissions must be reported geographically, with point sources identified and located precisely, and area sources apportioned to specific grids. For inventories in different localities to be compatible, a uniform reporting system must be used.

For the purposes of emission inventories, as discussed in this manual, point sources are defined[1] as sources that emit at least 100 tons per year of an air pollutant and that can be pinpointed to a definite geographic location or as sources listed in Appendix C regardless of their annual emissions. An area source, on the other hand, is one that emits less than 100 tons per year and is apportioned over a geographic area. (It should be noted that the value of 100 tons is the one chosen by EPA; the states may, at their discretion, select smaller values that best suit their own particular problems and needs.) These definitions apply to particulates, SO_x, CO, hydrocarbons, and NO_x. Every emitter of hazardous pollutants or trace elements and compounds is considered a point source.

Various grid systems utilizing coordinate systems have been developed for locating geographical points. The three most common systems are:

1. Latitude and longitude system.

2. State plane system.

3. Universal Transverse Mercator (UTM) system.

A detailed description of these systems has been provided by the Department of the Army[2] and Deetz and Adams,[3] who give excellent backgrounds for understanding the development of coordinate systems. Because of various disadvantages of the first two systems, the third, the Universal Transverse Mercator system, was developed by the U. S. Army. In this system, instead of using the equator as the "axis of the Mercator," the U. S. Army transversed (rotated) the axis 90 degrees and used a meridian running north-south as the axis from which all measurements would be made. In this manner, a meridian at any point on the globe may be selected so that an approximately 2,000-mile-wide (15 degrees to each side of the meridian) area of unskewed map covers any part of the world.

The Universal Transverse Mercator (UTM) system was designed by the U. S. Army[4] to provide for the projection of square grid zones with convenient measuring units. The system also maximizes the distance measurable from one pair of meridians and false origins with a reasonable amount of accuracy. The globe was subdivided into 60 north-south zones, each 6 degrees wide with a central transverse Mercator. Ten of these UTM zones cover the continental United States, as indicated in Figure 2-2. The false origin for each zone in the Northern Hemisphere is 500,000 meters west of the point where its central meridian crosses the equator. Using the UTM system, grid zones may be drawn for air pollution emission inventories.

The advantages of this system are:

1. UTM grids are continuous across the country and not hindered by political subdivisions.
2. UTM grids are uniform throughout the country.
3. Grid lines are identifiable by "tick marks" on the USGS maps.
4. The system is used worldwide.
5. The system is becoming the base repository for a growing body of technical information.
6. Interstate AQCR's must have a common coordinate system.

2.4.2 Use of UTM System

USGS maps do not show UTM grid lines as they do latitude and longitude; however, tick marks along the edges of the maps do indicate the grid locations. Three basic map scales are available:

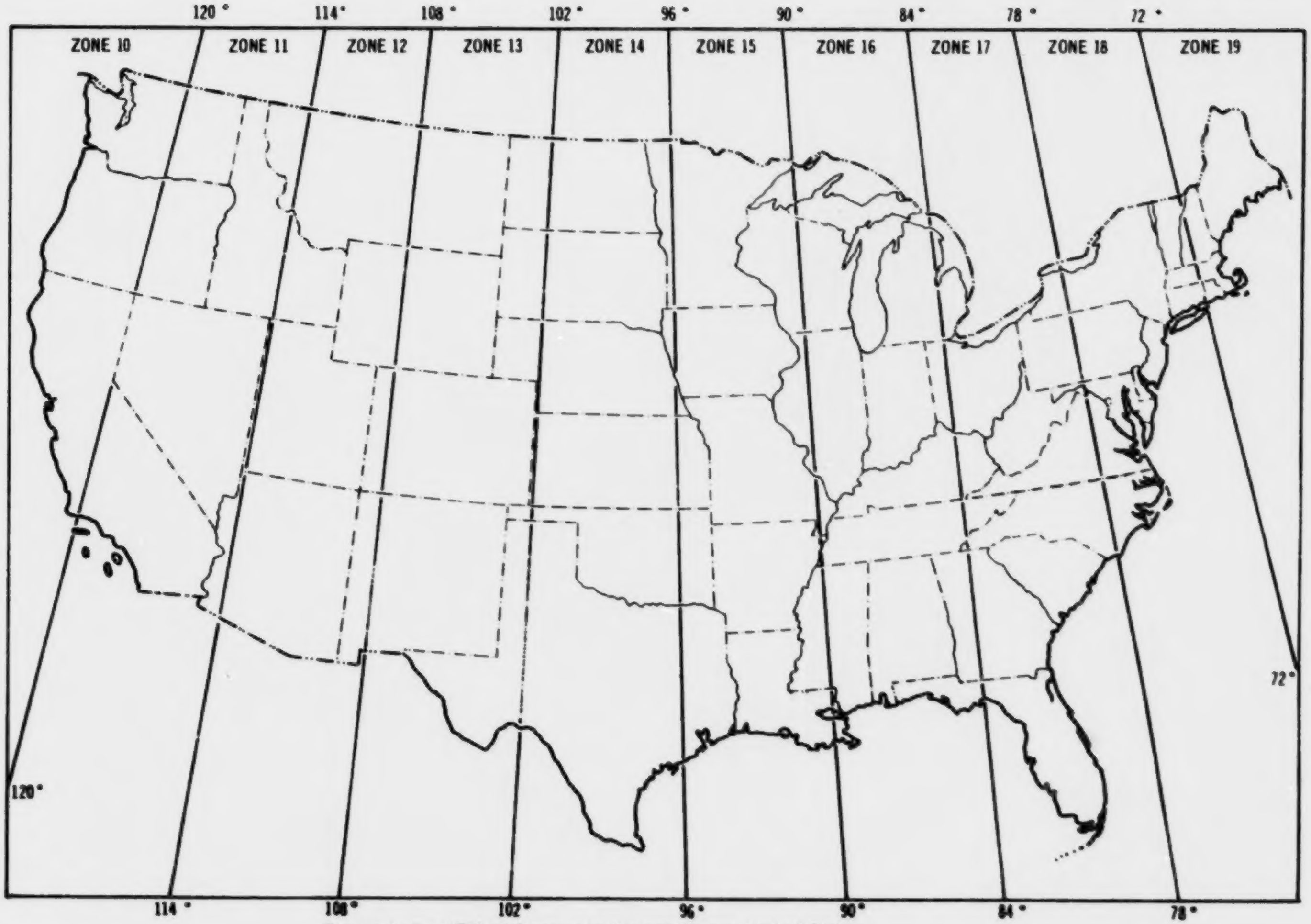

120 °
114°
108 °
102 °
96 °
90 °
84 °
78 °
72 °
ZONE 10
ZONE 11
ZONE 12
ZONE 13
ZONE 14
ZONE 15
ZONE 16
ZONE 17
ZONE 18
ZONE 19
72°
120°
114 °
108°
102°
96°
90°
84 °
78°

Figure 2-2. UTM grid zones in the contiguous United States.

1. 1:250,000.
2. 1:62,000.
3. 1:24,000.

For 1, the tick marks appear for every 10,000 meters; for 2 and 3, they appear for every 1000 meters, with every fifth tick mark giving the meter value. Also for 2 and 3, the meter values for the tick marks nearest the southeast and northwest corners of the map are given.

The 1:24,000 scale is necessary to locate point sources adequately; maps with these scales are readily available for many rural areas and for all metropolitan areas. A straight edge must be used to connect tick marks on the top and bottom of USGS maps when interpolating because the maps are drawn on the latitude-longitude system and, therefore, the UTM grids may appear quite skewed. To facilitate the reading of UTM grid coordinates and to avoid the need for visual interpolation, one should obtain translucent metric grid templates that can be used to overlay the grid zones.

The UTM zone number, which is indicated on each USGS map, must be cited to locate the coordinates properly. Figure 2-2 indicates that zones 10 through 19 encompass the 48 contiguous states; zones 1 through 9, Alaska; zones 19 and 20, Puerto Rico and the Virgin Islands; and zones 1 through 5, Hawaii. For a complete description of these zones, refer to Reference 5.

2.4.3 Air Quality Control Regions

The Office of Air Programs, EPA, has issued a publication[6] that clearly defines the boundaries of the AQCR's and lists the counties and cities in each region. Furthermore, an identification number has been assigned to each AQCR and county for automatic data processing; these identification numbers, shown in Appendix A, constitute the geographical identification file of the data system.

2.4.4 Population Data File

An emission inventory, the generation of which involves many steps, is for the purpose of ascertaining the quantity of emissions for some selected pollutants for a desired area such as county, city, or state. In this manual, particular emphasis is placed on obtaining estimates at the county level.

Because it is impossible to test all pollutant sources individually, particularly area sources, an estimating procedure must be used. In order to do this, however, one must estimate the magnitude of variables or indicators that can then be related to emissions. These indicators include such things as fuel consumption, vehicle miles, gasoline sales, raw materials processed, and tons of refuse burned, which are then multiplied by appropriate emission factors to estimate emissions.

Some emissions, however, can be related to the number of inhabitants in an area. Perhaps the best example of this kind of emission is that occurring from solid waste disposal. Studies[7] have shown that each person generates a daily average of 10 pounds of solid waste. In this case, lacking more precise information, an estimate of tons of refuse may be obtained by applying this figure to the population of the area of interest.

The use of "population data," as this information is called, has become an inherent part of the emission inventory procedure. It is often difficult and expensive to determine fuel consumption and other indicators of pollution in areas smaller than states or SMSA's (standard metropolitan statistical areas) because data are normally only reported for large geographic areas (i.e., states). In such cases, it is then necessary to apportion these totals to each county or city of interest. The several ways of doing this, depending on the source category of emissions, require the use of population ratios, number of household units in an area, number of manufacturing employees, urban-rural population ratio, amount of construction, or number of retail and wholesale establishments. Without this information, it would be very difficult to obtain estimates of emissions for smaller areas.

Population data may be obtained from a variety of sources. The Bureau of Census publishes many documents containing such information; the three most valuable for inventory purposes are the Census of Population,[8,9] the Census of Housing,[10] and the Census of Manufacturing.[11] As the name indicates, the census of population contains official population counts for states, urban and rural residences, SMSA's, and counties. The census of housing contains detailed housing characteristics such as number of occupied dwelling units, number of rooms per structure, equipment (heating, air conditioning), and fuels used for heating and cooking. The census of manufacturing is comprised of 80 separate reports, and summary figures are provided for 422 manufacturing industries on quantity and value of goods shipped, cost of fuels and electric energy, employment, etc.

Apportionment on the basis of population data is primarily used in determining emissions from area sources. Procedures for identifying these emissions will be discussed in detail in Chapter 5. The following, however, are simplified examples of how population data can be used for this purpose if more detailed data are not available as described in Chapter 5.

If residential or commercial coal consumption for a state is known and apportionment to a specific county within the state is required, simply multiply the amount of coal for the state by the ratio of the population of the county to that of the state. This method will permit an estimate of coal consumption to be made for each county. This procedure is reasonable if the coal consumption is primarily for residential use, as would probably be true of anthracite coal. The procedure also assumes that the coal consumption is spread uniformly over the state.

In estimating industrial fuel use, apportionment is made on the basis of the number of manufacturing employees. To apportion commercial and institutional fuel quantities, use either population figures alone or a combination of population and number of retail and wholesale establishments, depending on the area under study (see Chapter 5).

Census data are also used in estimating emissions from mobile sources. It has been found that emissions vary according to the characteristics of driving: stop-and-go city driving leads to greater emissions than open-road driving.[12] It thus becomes necessary to obtain estimates of the ratio of urban to rural driving from the census of population. Sometimes it is necessary to use gasoline consumption data to estimate these emissions, in which case apportionment by the population file would be made.

2.5 AUTOMATIC DATA PROCESSING (ADP) SOFTWARE

Following the definition of storage and identification file formats, the ADP programming necessary for data storage, maintenance, manipulation, and retrieval can begin. Conceptually, some of these functions are shown in Figure 2-1 (right-hand side). These programs, which constitute the ADP software necessary to utilize the source and identification data, include:

1. Input/output programs.
2. Emission calculation programs - for use in applying emission factors to source data to obtain emissions.
3. Areawide inventory programs - for outputting data in a form suitable for reporting point and area source emissions by source classification and geographical areas.
4. IPP modeling conversion program - for selecting items of data from the source files to be used for modeling, and for outputting these items in the proper format for input to the IPP programs.
5. Area source gridding program - for apportioning the area source emissions to grids in a form suitable for input to IPP modeling.
6. Trend/projection analysis programs - for utilizing available data to ascertain trends or projections of emissions by sources and geographical areas.

The programs for these operations are currently being prepared by EPA.

2.6 UPDATING DATA FILES

Source files (point, area, and hazardous pollutants) must be continuously updated to keep the emission inventory current. Information for the update can come from permit or registration activities as well as from inspection reports. The emission factor file will also be updated continuously as new information from source testing becomes available.

2.7 REFERENCES

1. Federal Register, Part II. August 14, 1971. p. 15497.
2. Grids and Grid References. Department of the Army. Washington, D. C. Publication No. TM5-241-1. June 1967.
3. Deetz, C. H. and D. S. Adams. Elements of Map Projection. U.S. Department of Commerce. Washington, D.C. Spec. Publication No. 68. 1945.
4. Universal Transverse Mercator Grid. U.S. Department of the Army. Washington, D.C. Publication No. TM5-241-8. July 1958.
5. Universal Transverse Mercator Grid, Zone-to-Zone Transformation Tables. U.S. Department of the Army. Washington, D.C. Publication No. TM5-241-2. June 1957.
6. Federal Air Quality Control Regions. U.S. Environmental Protection Agency, Office of Air Programs. Research Triangle Park, N.C. OAP Publication No. AP-102. January 1972.
7. National Survey of Community Solid Waste Practice. Interim report. U.S. DHEW, PHS. Washington, D.C. 1968.
8. 1970 Census of Population, Number of Inhabitants. PC (1)-A series. U.S. Department of Commerce, Bureau of Census. Washington, D.C. 1970.
9. 1970 Census of Population, General Population Characteristics. PC (1)-B series. U.S. Department of Commerce, Bureau of Census. Washington, D.C. 1970.
10. 1970 Census of Housing, Detailed Housing Characteristics. HC (1)-B series. U.S. Department of Commerce, Bureau of Census. Washington, D.C. 1970.
11. 1967 Census of Manufacturing, Final Industry Reports. MC 67 (2) series. U.S. Department of Commerce, Bureau of Census. Washington, D.C. 1967.
12. Cernansky, N. P. and K. Goodman. Estimating Motor Vehicle Emissions on a Regional Basis. Presented at the 63rd Annual Air Pollution Control Association Meeting, June 14-18, 1970.

3. EMISSION FACTORS

3.1 EMISSION FACTORS DEFINED

In the assessment of community and national air pollution, there is a critical need for accurate data on the quantity and characteristics of emissions from the numerous sources that contribute to the problem. The large numbers of these individual sources and their diversity make field measurements of all sources of emissions impossible. The only practical approach is to make generalized estimates of typical emissions for each of the source classifications when actual field test data are not available.

The emission factor is a statistical average or a quantitative estimate of the rate at which a pollutant is released to the atmosphere as a result of an activity such as combustion or industrial production, divided by the level of that activity. For example, assume that in the production of 260,000 tons of ammonia per year, 26,000 tons of carbon monoxide is emitted to the atmosphere. The emission factor for the production of ammonia would therefore be 200 pounds (0.1 ton) of CO released per ton of ammonia produced. The emission factor thus relates the quantity of pollutants emitted to some indicator of activity such as production capacity, quantity of fuel burned, or vehicle miles traveled.

Many techniques are available for use in determining emission factors. These techniques include detailed source testing involving many measurements related to a variety of process variables, single measurements not clearly defined as to their relationship to process operating conditions, process material balances, and engineering appraisals (estimates) of a given process.

The limitations and applicability of emission factors must be understood: in general, emission factors are not precise indicators of emissions from a single source, but are more valid when applied to a large number of sources and processes. When such limitations are taken into account, emission factors can be extremely useful in conducting source inventories as a part of community or nationwide air pollution studies.

Emission factors may be found in a number of literature sources. The most complete collection of factors has been published by the Environmental Protection Agency in AP-42, Compilation of Air Pollutant Emission Factors (revised 1973).[1]

3.2 USE OF EMISSION FACTORS

Emission factors are used in conjunction with source information gained through methods described elsewhere in this document. The information needed for area and point sources will vary. When calculating area source emissions, a generalized emission factor may be used with fuel data, vehicle miles, or other activity level to estimate the emissions. For point sources it is very important that actual data be available from questionnaires, on-site visits, telephone contacts, etc. in sufficient detail to determine which factor to use, the production factors involved, realistic estimates of control efficiencies, and any unique characteristics that might affect the emissions. It is important that the information used contain detail on minor operations, parallel or preparatory processes, and air pollutants from sources other than the main production activity. Though the emission factor procedure is simple in nature, utilization of factors cannot be entirely mechanical. Engineering knowledge and judgment are often necessary to arrive at realistic estimates. Emission factors are chosen from Compilation of Air Pollutant Emission Factors[1] and multiplied by the activity level information available; correct units must be used. This product will be the estimated emissions for the time frame in consideration (i.e., tons per day or tons per year).

3.3 CONTROL EQUIPMENT

When selecting an emission factor, care must be taken to determine whether it is for emissions before or after control. Most factors are presented in terms of uncontrolled or precontrolled quantities. A few source categories, however, have factors that can be used to estimate the emissions on a controlled or partially controlled basis because of the uniqueness of the process equipment or sources of data available. In those cases where a factor that takes controls into account is given, no further adjustment need be made to the emission estimate.

If the emission factor used gives an estimate of emissions before control, the factor must be adjusted to reflect effects of control equipment employed. For example, if a source has an activity level of 1000 tons production per year and the uncontrolled factor is 1 pound of particulates per ton of product, the particulate emissions before control would be 1000 pounds per year. If a baghouse having a 99 percent efficiency were attached to the process, then the "controlled" emissions (i.e., emissions after effects of control) would be 10 pounds of particulates per year. Thus both emission factors and control equipment effects must be considered when estimating emissions.

Efficiency of a particular control device or type of control device can vary considerably, depending upon a number of source-related variables such as particle size, pressure drop, equipment deterioration, gas concentrations, and physical and chemical characteristics of the pollutants. A control device for one pollutant may also affect the removal of another pollutant. This might occur, for example, when a wet scrubber, primarily for particulates, also removes some percentage of sulfur oxides. The sulfur oxide removal in this case would be termed secondary control. For these reasons it is necessary to define typical control efficiencies by pollutant for the devices used in terms of each specific process or operation. These definitions are currently being developed by EPA.

3.4 SOURCE CLASSIFICATION CODE

For the purpose of data collection, the emission factors and control equipment efficiencies have been identified by the individual process or activity that might be defined as a point source. A series of point source classification codes has been developed for those sources for which emission factors are available. Four levels of identification are used. These four levels are sufficient to define a general category, and subcategories within the general category. The subcategories define classification as to fuels, industrial processes, products, equipment types used, etc. The classification system is quite flexible, and new or revised emission factors may be added easily.

3.5 QUALITY RATINGS OF EMISSION FACTORS

Emission factor accuracy and reliability are dependent upon many variables. It is generally accepted that emission factors generated from on-site source-test data are preferred and will give more realistic estimates than those developed strictly from engineering analyses or material balances. Even the well-balanced factors at best will have an inherent variability influenced by source-test inaccuracies, material fluctuations, and age and condition of control devices.

In the past, the level of reliability of emission factors has been represented by an alphabetic code: "A" through "E," where "A" indicates a rating of "excellent." An attempt is currently underway to attach a number to this reliability. This quality factor should be integrated into the emission factor codes and should be available in such a fashion that by combining the individual quality levels and the emissions in each source category, a reliability rating for the overall emission inventory for an area may by realized. The quality ratings are indicated in Compilation of Air Pollutant Emission Factors.[1]

3.6 REFERENCE

1. Compilation of Air Pollutant Emission Factors. U. S. Environmental Protection Agency, Office of Air Programs. OAP Publication No. AP-42. Research Triangle Park, North Carolina. March 1973.

4. POINT SOURCE CODING

4.1 DESCRIPTION OF POINT SOURCE CODING FORM

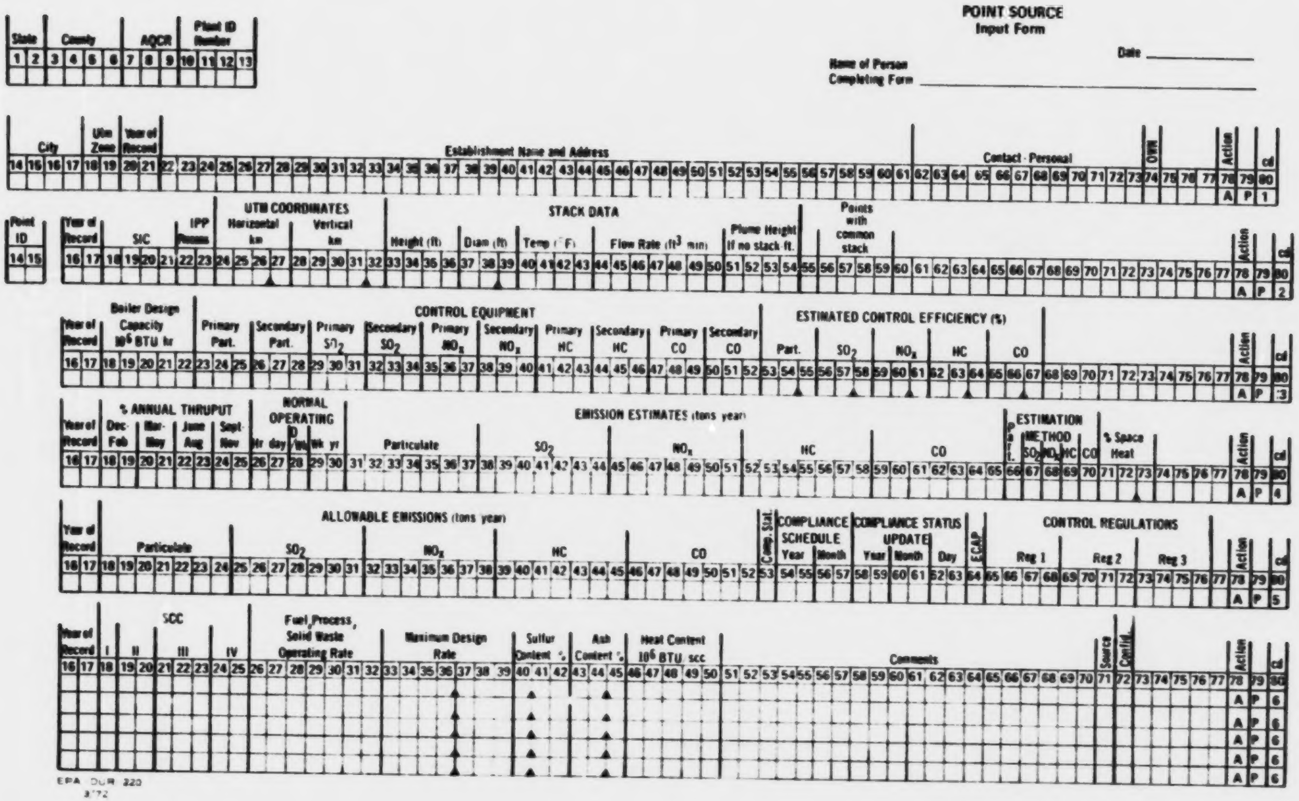
The point source coding form shown in Figure 4-1 contains space for six separate computer cards of data for each point source. At least one coding form should be completed for each facility defined as a point source. As outlined in the Federal Register, November 25, 1971, 51.1(K), a point source is:

> (a) any stationary source causing emissions in excess of 100 tons (90.7 metric tons) per year of any pollutant for which there is a national standard in a region containing an area whose 1970 "urban place" population, as defined by the U.S. Bureau of Census, was equal to or greater than 1 million, or (b) any stationary source causing emissions in excess of 25 tons (22.7 metric tons) per year of any pollutant for which there is a national standard in a region containing an area whose 1970 "urban place" population, as defined by the U.S. Bureau of Census, was less than 1 million, or (c) without regard to amount of emissions, stationary sources such as those listed in Appendix C to this part.

Also included in a definition of point sources are the sources included in a comprehensive permit or registration system already maintained by the agency.

Source data required on the coding form are needed for the following reasons:

1. To locate the source geographically and to index it with respect to county, state, city, and AQCR.
2. To describe the process and operating conditions of the source along with details on air pollution control equipment and emission characteristics.
3. To automatically calculate emissions of particulates, SO_x, hydrocarbons, NO_x, and CO by means of current emission factors.
4. To provide input data for mathematically modeling the local air quality; the modeling, in turn, allows the enforcing agency to develop control strategies on a rational basis after evaluating numerous combinations of possible alternatives.
5. To ascertain the legal status of each point source in complying with current pollution control regulations (i.e., allowable emissions, compliance schedules, and variances).



POINT SOURCE
Input Form

Name of Person Completing Form ______________________

Date ____________

State	1 2
County	3 4 5 6
AQCR	7 8 9
Plant ID Number	10 11 12 13

City	14 15 16 17
Utm Zone	18 19
Year of Record	20 21
Establishment Name and Address	22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61
Contact - Personal	62 63 64 65 66 67 68 69 70 71 72 73
OWN	74
	75 76 77
Action	78 A
	79 P
cd	80 1

Point ID	14 15
Year of Record	16 17
SIC	18 19 20 21
IPP Process	22 23
UTM COORDINATES Horizontal km	24 25 26 27
UTM COORDINATES Vertical km	28 29 30 31 32
STACK DATA Height (ft)	33 34 35 36
STACK DATA Diam (ft)	37 38 39
STACK DATA Temp (°F)	40 41 42 43
STACK DATA Flow Rate (ft³/min)	44 45 46 47 48 49 50
Plume Height if no stack ft.	51 52 53 54
	55
Points with common stack	56 57 58 59
	60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77
Action	78 A
	79 P
cd	80 2

Year of Record	16 17
Boiler Design Capacity 10^6 BTU/hr	18 19 20 21 22
CONTROL EQUIPMENT Primary Part.	23 24 25
CONTROL EQUIPMENT Secondary Part.	26 27 28
CONTROL EQUIPMENT Primary SO_2	29 30 31
CONTROL EQUIPMENT Secondary SO_2	32 33 34
CONTROL EQUIPMENT Primary NO_x	35 36 37
CONTROL EQUIPMENT Secondary NO_x	38 39 40
CONTROL EQUIPMENT Primary HC	41 42 43
CONTROL EQUIPMENT Secondary HC	44 45 46
CONTROL EQUIPMENT Primary CO	47 48 49
CONTROL EQUIPMENT Secondary CO	50 51 52
ESTIMATED CONTROL EFFICIENCY (%) Part.	53 54 55
ESTIMATED CONTROL EFFICIENCY (%) SO_2	56 57 58
ESTIMATED CONTROL EFFICIENCY (%) NO_x	59 60 61
ESTIMATED CONTROL EFFICIENCY (%) HC	62 63 64
ESTIMATED CONTROL EFFICIENCY (%) CO	65 66 67
	68 69 70 71 72 73 74 75 76 77
Action	78 A
	79 P
cd	80 3

Year of Record	16 17
% ANNUAL THRUPUT Dec-Feb	18 19
% ANNUAL THRUPUT Mar-May	20 21
% ANNUAL THRUPUT June-Aug	22 23
% ANNUAL THRUPUT Sept-Nov	24 25
NORMAL OPERATING Hr/day	26 27
NORMAL OPERATING D/wk	28
NORMAL OPERATING Wk/yr	29 30
EMISSION ESTIMATES (tons/year) Particulate	31 32 33 34 35 36 37
EMISSION ESTIMATES (tons/year) SO_2	38 39 40 41 42 43 44
EMISSION ESTIMATES (tons/year) NO_x	45 46 47 48 49 50 51
EMISSION ESTIMATES (tons/year) HC	52 53 54 55 56 57 58
EMISSION ESTIMATES (tons/year) CO	59 60 61 62 63 64 65
ESTIMATION METHOD Part.	66
ESTIMATION METHOD SO_2	67
ESTIMATION METHOD NO_x	68
ESTIMATION METHOD HC	69
ESTIMATION METHOD CO	70
% Space Heat	71 72 73
	74 75 76 77
Action	78 A
	79 P
cd	80 4

Year of Record	16 17
ALLOWABLE EMISSIONS (tons/year) Particulate	18 19 20 21 22 23 24
ALLOWABLE EMISSIONS (tons/year) SO_2	25 26 27 28 29 30 31
ALLOWABLE EMISSIONS (tons/year) NO_x	32 33 34 35 36 37 38
ALLOWABLE EMISSIONS (tons/year) HC	39 40 41 42 43 44 45
ALLOWABLE EMISSIONS (tons/year) CO	46 47 48 49 50 51 52
Comp. Stat.	53
COMPLIANCE SCHEDULE Year	54 55
COMPLIANCE SCHEDULE Month	56 57
COMPLIANCE STATUS UPDATE Year	58 59
COMPLIANCE STATUS UPDATE Month	60 61
COMPLIANCE STATUS UPDATE Day	62 63
ECAP	64
CONTROL REGULATIONS Reg 1	65 66 67 68
CONTROL REGULATIONS Reg 2	69 70 71 72
CONTROL REGULATIONS Reg 3	73 74 75 76
	77
Action	78 A
	79 P
cd	80 5

Year of Record	16 17
SCC I	18
SCC II	19 20
SCC III	21 22 23
SCC IV	24 25
Fuel, Process, Solid Waste Operating Rate	26 27 28 29 30 31 32
Maximum Design Rate	33 34 35 36 37 38 39
Sulfur Content %	40 41 42
Ash Content %	43 44 45
Heat Content 10^6 BTU/scc	46 47 48 49 50
Comments	51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70
Source	71
Confid.	72
	73 74 75 76 77
Action	78 A A A A A
	79 P P P P P
cd	80 6 6 6 6 6

EPA DUR 220
3/72

Figure 4-1. Point source coding form.

The layout of the six cards on the coding form is such that data least likely to change are on the first cards, and data most likely to change are on the last cards at the bottom of the coding form. This arrangement allows updating the point source data at a later time without unnecessarily rewriting the entire coding form. Moreover, the system is designed to facilitate the collection and recording of any additional data on the point sources that may be required in the future. Such expansion as the need arises is necessary in compiling a comprehensive inventory.

4.2 INSTRUCTIONS FOR COMPLETING POINT SOURCE CODING FORM

Certain instructions that apply to the entire form include the following:

1. Zeros are treated either as numbers or to indicate fields that are nonapplicable; blank spaces in a field indicate a lack of data. This means that the system separates items that are either numerically zero or not applicable from those that are unknown. If a field is nonapplicable, then only one zero need be tabulated in the right-justified columns of the field.
2. Only specified alphabetical or numerical characters are allowed to be entered in the columns. No unusual marks are to be made in the spaces. No data field headings are to be changed and only data appropriate to the field are to be entered. This rule prevents unnecessary keypunching errors in processing the forms.
3. Only the allowed coding values may be entered in columns that require coding symbols. The coding lists may be expanded as needed from time to time.
4. Instructions for filling out each card on the form are quite specific and were designed to apply to the large majority of point sources. Nevertheless, it is recognized that assumptions must occasionally be made to reflect the real, physical situation at an unusual point source. Care should be taken to make reasonable assumptions that most nearly correspond to the true circumstances at the point source.
5. Any boiler should be considered a separate and individual point source and coded on a separate coding form. For example, if two or more such boilers at a facility discharge gases into one smokestack, then two (or more) coding forms should be completed. However, there are instances when it is permissible to combine boilers as a single point source:
    a. Where two or more similar small boilers (burning the same type fuel, having the same operating hours, and having similar capacities) are dis-

charged through a common stack, they may be combined as a single source on one coding form if the total emission of any one pollutant is less than 100 tons per year.

b. Where a number of very small similar boilers exists at a facility, each emitting five tons per year or less of any pollutant and each discharging through separate similar stacks, they may be combined as a single source on one coding form.

When combining boilers as in (a) or (b), the boiler capacity shown in columns 18 through 22, card 3, is the sum of capacities of the combined boilers. The fuel use entered in columns 26 through 32, card 6, must be totals of each fuel used in the combined boilers. Appropriate comments in columns 51 through 70, card 6, must show the number and typical boiler capacity of the boilers which have been combined. Boilers having emissions controls are not to be combined with boilers not having controls.

6. When several similar boilers emit through several stacks with the number of stacks not equal to the number of boilers, retain the actual stack data and apportion the boilers so total capacity and emissions are proportionally distributed among stacks.

7. If a plant or facility has several emitting sources (i.e., boilers, processes, incineration) and the sum of emissions from all sources within the facility qualifies it as a point source as defined in 4.1, then these emitting sources are to be coded on coding forms.

8. Boiler, process, and solid waste source data for a facility should be entered on separate coding forms. Combustion data other than boiler (designated C in space 71, card 6) are to be entered with process data on the same coding form only when the combustion is an integral part of the process and the exhaust gases are commingled in the process.

9. Solvent, hydrocarbon, fuel, and other organic vapor losses from storage and handling operations in a facility are emissions and are to be appropriately reported on one or more source coding forms.

10. The following identification parameters must be filled on every point source form:

Parameter	Card Columns
State	1 - 2
County	3 - 6
AQCR	7 - 9
Plant ID Number	10 - 13

Parameter	Card Columns
Point ID	14 - 15
SCC	18 - 25

Each of the above defined card columns must be filled out. There may be no blanks.

Detailed instructions are given below for completing each card in the coding form. It should be noted that special coding lists are required when "numerical code" or "alphabetical code" appears in the column headed "Symbol."

4.3 IDENTIFICATION AND LOCATION OF POINT SOURCES

Card 1 - General Facility Identification

Spaces	Format	Symbol	Description	Unit
1-2	XX	Numerical Code	State Coding Number	-
3-6	XXXX	Numerical Code	County Coding Number	-
7-9	XXX	Numerical Code	AQCR Number	-
10-13	XXXX	Numerical Code	Source Number Within the County	-
14-17	XXXX	Numerical Code	City Coding Number	-
18-19	XX	Numerical Code	UTM Zone Number	-
20-21	XX	Numerical Code	Year of Record	-
22-61	A-A	Alphabetical and Numerical	Name and Address of Establishment	-
62-73	A-A	Alphabetical	Person to Contact about Pollution Control	-
74	A	Alphabetical	Ownership of Facility	-

1. State Coding Number: Identification coding lists are tabulated in the Geographical Identification Code, Appendix A, Section 1. These codings are compatible with the SAROAD air quality numbering system.
2. County codes to be used are listed in the SAROAD Station Coding Manual for Aerometric Sampling Networks, Publication No. APTD-0907 of the Environmental Protection Agency.[1]
3. AQCR Number: Numbers for the Air Quality Control Regions are specified in the Geographical Identification Code, Appendix A, Section 1.
4. Source Number: This column identifies each point source in a county. The numbering system is sequential, starting with the number one and continuing until all facilities containing point sources that are located in a given

county are assigned a number. It should be noted that each plant, facility, or establishment containing one or more emission points (e.g., stacks) will be assigned a unique identification number within the county.

5. City Coding Number: It is advantageous to identify those point sources that are within cities, towns, or urban areas. If the source is within the geographical boundaries of any of the cities listed in the SAROAD Station Coding Manual for Aerometric Sampling Networks,[1] enter the four-digit code number corresponding to that city. There are a few cities in the United States that are not considered to be inside any county but, rather, are considered independent entities. In such cases, enter the city code in both "city" and "county" coding columns. Do not enter a town or city code if the facility is situated outside the boundary of the city of address.

6. UTM Zone Number: The zone number must be known in order to locate the point source via the UTM coordinate system; this number is found on all USGS maps showing UTM coordinates. Although most states are within a single UTM zone, a few states and counties are in two UTM zones. For this reason a UTM zone number is required for each coding form.

7. Year of Record: The last two digits of the calendar year that the data on card 1 represent are recorded here.

8. Establishment Name and Address: This column will, in most cases, provide a descriptive name for the facility and a usable mailing address. It is important to leave blank spaces between words to ensure readable entries. Common abbreviations, such as AM for American, CO for company, BROS for brothers, and INC for incorporated, should be used as much as possible. The address should include a street number, city, and, preferably, a zip code. The state name is unnecessary. Again, abbreviate when possible to conserve space and to allow room for an intelligible and usable address; abbreviate the city's name if necessary. Record the physical location of the source if possible, rather than the name and address of a distant headquarters. If there is no official proper name for the source, then record a descriptive name and usable address, such as CITY DUMP NR 3, ENGR DEPT, CITY HALL.

9. Person to Contact about Pollution Control: The last name of the person responsible for pollution control activity at the source should be recorded in this column. If the responsible individual is not identifiable, then record a descriptive and appropriate title such as PLANT MGR. Leave blank spaces between names and initials.

10. Ownership of Facility: The following code list should be used to complete this column:

Symbol	Ownership
P	Private
L	Local government
S	State government
F	Federal Government
U	Utility (electric power plants, etc.)

11. When there are multiple stacks or point sources at a facility, complete spaces 14 through 74 on card 1 on only the first point source coding form; all other point source coding forms relating to additional points within the plant have these spaces blank for card 1.

4.4 STACK PARAMETERS

Cards 2 through 6 on the coding form relate to separate emission points that are located within the facility (identified on card 1). For example, a facility or plant as previously defined could have more than one emission point within its boundaries. One coding form must be completed for each of these locations within the facility. For example, if there are two separate smokestacks within a power-plant complex, then complete two coding forms and include: (1) the same facility identification number and data on card 1, and (2) different emission point identification numbers (referring to the individual smokestacks) on cards 2 through 6 of each form.

Occasionally, a qualitative judgment must be made when the distinction between emitting point sources within the facility is vague. Common sense should then dictate whether the sources should be reported separately on the coding form or combined into a single, apparent point source. For example, if a single drying kiln has a multitude of vents to the atmosphere from the same process, then combining these vents into a single one for reporting purposes would be acceptable. If the same stack or control equipment is used for two different processes that operate seasonally or consecutively during the year, then consider this particular facility to have two separate emission points and complete two coding forms.

Card 2 - Stack Parameters

Spaces	Format	Symbol	Description	Unit
14-15	XX	Numerical	Emission Point Identification Number	-

Card 2 (continued) - Stack Parameters

Spaces	Format	Symbol	Description	Unit
16-17	XX	Numerical	Year of Record	-
18-21	XXXX	Numerical Code	SIC Code	-
22-23	XX	Numerical Code	Process Code	-
24-27	XXX.X	Numerical	UTM Horizontal Coordinates	km
28-32	XXX.X	Numerical	UTM Vertical Coordinates	km
33-36	XXXX	Numerical	Stack Height	ft
37-39	XX.X	Numerical	Stack Equivalent Diameter	ft
40-43	XXXX	Numerical	Stack Temperature	°F
44-50	XXXXXXX	Numerical	Stack Exhaust Flow Rate	ft^3/min
51-54	XXXX	Numerical	Plume Height	ft
56-59	XXXX	Numerical	Points with Common Stack	-

1. Emission Point Identification Number: This is a sequential number designated for each pollutant discharge point within the facility. One coding form will be completed for every point source within the facility.

2. Year of Record: The last two digits of the year that the data on card 2 represent should be entered here. This column will be automatically updated whenever information on the card is added, changed, or deleted.

3. SIC Code: This information is necessary to use the source data for modeling air quality. Enter the appropriate Standard Industrial Classification code (SIC code).[2]

4. Process Code: This column should be completed only when a process code for the activity has been listed in Appendix A, Section 4. The IPP process code for combustion is to identify the manner of coal firing in boilers (for codes other than 00). If coal is used part of the time or entirely, the code will be other than 00.

5. UTM Horizontal and Vertical Coordinates: The UTM coordinate system is another means of identifying the location of the point source. Coordinates are obtained from USGS maps or their equivalent with scales less than 1:62,500. All spaces in these columns must be filled in with numbers and zeros if coordinates are available to an accuracy of 1 kilometer (0.1-kilometer accuracy is desired); otherwise, leave the columns blank.

6. Stack Height: In the majority of cases, the exact location of the discharge of pollutants will be well defined; there will be a stack or some other enclosed, constrained, or physically-bounded area where pollutants are emitted. In such instances, the stack height is the vertical distance

between the point of emission and ground level. If an estimate of stack height must be made, that value will be rounded to the nearest 10 feet and entered on the form. There are, however, point sources that have one or more of the following characteristics:

a. No clear-cut or enclosed point of emission.

b. No stack height (e.g., burning dumps).

c. A changing locus of emissions within the facility (i.e., leaking valves at an oil refinery, dust from moving equipment in a quarry).

In such cases, the stack height, temperature, and flow rate columns on the coding form will be marked with zeros, and columns 51 through 54 on card 2 will be completed.

7. Stack Diameter: The stack diameter is the inside diameter of a round gas exit at the point of emission; for non-round exits, it is an equivalent diameter calculated from the cross-sectional area at point of discharge. Using a measured or estimated cross-sectional area, the equivalent diameter (De) is calculated as follows:

$$De = 1.128 \sqrt{A}$$

where A is in square feet. For another common occurrence--the rectangular stack exit--the stack diameter must be calculated from the total cross-sectional area; it cannot be assumed to be one of the linear dimensions.

When combining several similar boilers which emit pollutants through separate stacks, the following procedure will be used to determine the actual stack parameters. Calculate K_i for each individual stack using the following equation:

$$K_i = (H_i)(V_i)(T_{si})/Q_i$$

where H_i = individual stack height (ft)
V_i = individual gas flow rate (ft^3/min)
T_{si} = individual stack temperature (°F)
Q_i = individual emission rate of any common pollutant (T/yr).

Select the stack with the lowest K_i value, and enter this stack height, diameter, temperature, and flow rate on the coding form in the appropriate fields. Also include in the "Comments" section the total number of boilers and the total number of stacks combined. If two or more sources are served by a common stack, enter the actual diameter of the stack in spaces 37 through 39, card 2, on each point source coding form.

8. Stack Temperature: The temperature of the exhaust stream at the stack exit should be reported in degrees Fahrenheit under normal operating conditions. If measured temperatures are not available, an estimate to the nearest 50° F should be made. If no fuel combustion is involved in the process, and if the exhaust gas appears to be discharged at ambient air temperatures, then record the stack gas temperature as 50° F unless a more valid assumption is apparent. If plume height is entered for a source, enter 77 °F for cases without combustion and estimate the temperature for cases with combustion.

9. Stack Exhaust Flow Rate: This number should be specified by recording the design or maximum exhaust-gas volume unless actual measurements are available. Units are actual cubic feet per minute and represent the total volume of exhaust gas released at the operating temperature of the stack (assume gas pressure is the same as normal atmospheric pressure). When two or more boilers discharge into a common stack and each boiler is coded on a separate form, the exit-gas flow rate corresponding to each boiler is entered on the coding form.

10. Plume Height: This column is to be filled in if the previous spaces on stack data (except temperature) all contain zeros. Conversely, if stack height, diameter, temperature, and flow rate were reported, then this column should contain a zero. The plume height is a gross estimate and is used only when the source has one of the following characteristics:

    a. No clear-cut enclosed point of emission (e.g., gas leaks at an oil refinery).

    b. No stack height (e.g., burning dumps).

    c. A mobile emission point within the facility (e.g., quarry).

    d. Pollutants released into the atmosphere at ambient temperatures through diffusion (e.g., gasoline storage tanks).

Many point sources have no true stack release points (whereby the gases are forcibly exhausted to the atmosphere from an enclosed area). In such cases columns 51 through 54 must be completed. If there is a physically definable height above ground level where the pollutants are discharged, then enter this value (in feet) in the spaces. Examples of this class are gasoline storage tanks and uncontrolled grain-drying operations where the height of the tank or dryer would be considered the plume height. On the other hand, some sources, such as some quarries, burning dumps, and gas leaks at ground level at an oil refinery, have no discernible emission height. In such cases enter a zero in column 54. Processes that discharge emissions at ambient temperatures mainly through ground-level leakage or diffusion should also be considered to have a zero plume height. In such cases the exhaust flow rate entered in columns 44 through 50 will also be zero. Ground-level emissions which are coded zero plume height should have an appropriate temperature entered in columns 40 through 43. Conical refuse burners must have stack data entered on the coding form.

11. Spaces 56 through 59 on card 2 are to be completed whenever the exit gases from multiple point sources are discharged through a single stack. When this situation occurs, all point sources discharging into the single common stack must be numbered sequentially. Numbers in spaces 56 through 59 should be entered as if the following sentence were to be completed: "Emissions from point sources (56 through 57) through (58 through 59) in this facility are discharged through one single and common stack." All entries must be numerical and the ID number of the point source must be one of those multiple sources discharging through the common stack. For example, if a facility has 5 point sources and point sources 3, 4, and 5 discharge into a single stack, then coding forms for points 3, 4, and 5 would have identical entries in columns 56 through 59 on card 2 of all coding forms, whereas zeros would be entered in spaces 56 through 59 on those coding forms for point sources 1 and 2.

4.5 CONTROL EQUIPMENT IDENTIFICATION CODE

Card 3 contains data on the installed air pollution control equipment at the point source and on the corresponding pollutant removal efficiency of that equipment. Data correspond to the point source identified on card 2 of the coding form.

1. Year of Record: The last two digits of the calendar year that the data on card 3 represent should be entered here.
2. Boiler Design Capacity: A boiler will be defined as consisting of a burner, firebox, heat exchanger, and a means of creating and directing a flow of gases through the unit. The boiler design capacity, which is defined as the boiler input capacity before heat transfer, will be entered here. Otherwise, enter a zero in the column to depict nonapplicability. Units are in millions of Btu per hour based on the maximum capacity or design of the boiler.
3. Pollutant Control Equipment: Primary and secondary control equipment for each of the five common pollutants is reported in these columns:
   a. Primary Control Equipment: Any installed equipment or device that is located at the point source and whose main purpose is reducing emissions of a pollutant must be reported as a primary control device for that pol-

Card 3 - Control Equipment

Spaces	Format	Symbol	Description	Units
16-17	XX	Numerical	Year of Record	-
18-22	XXXXX	Numerical	Boiler Design Capacity	10^6 Btu/hr
23-25	XXX	Numerical Code	Primary Particulate Control Equipment Code	-
26-28	XXX	Numerical Code	Secondary Particulate Control Equipment Code	-
29-31	XXX	Numerical Code	Primary SO_x Control Equipment Code	-
32-34	XXX	Numerical Code	Secondary SO_x Control Equipment Code	-
35-37	XXX	Numerical Code	Primary NO_x Control Equipment Code	-
38-40	XXX	Numerical Code	Secondary NO_x Control Equipment Code	-
41-43	XXX	Numerical Code	Primary Hydrocarbon Control Equipment Code	-
44-46	XXX	Numerical Code	Secondary Hydrocarbon Control Equipment Code	-
47-49	XXX	Numerical Code	Primary CO Control Equipment Code	-
50-52	XXX	Numercial Code	Secondary CO Control Equipment Code	-
53-55	XX.X	Numerical	Estimated Control Efficiency, Particulates	%
56-58	XX.X	Numerical	Estimated Control Efficiency, SO_x	%
59-61	XX.X	Numerical	Estimated Control Efficiency, NO_x	%
62-64	XX.X	Numerical	Estimated Control Efficiency, Hydrocarbon	%
65-67	XX.X	Numerical	Estimated Control Efficiency, CO	%

lutant using only those coding values tabulated in Control Equipment Identification Code, Appendix A, Section 3. In cases where the efficiency range of the device is unknown or where none of the equipment codes appear to be applicable, choose the device that most nearly resembles the actual equipment and include a comment on card 6. Only control devices that reduce the uncontrolled emissions normally associated with the process should be reported. Do not report equipment that is a normal part of the source activity even though the quantity of the pollutants emitted may be reduced. For example, the recovery system for coke by-product gases of a coke oven should not be reported as pollution control equipment for hydrocarbons. If there are no control devices actually installed at the source, enter a zero in each column; if the status of the source is unknown, leave the columns blank.

b. Secondary Control Equipment: Secondary control equipment shall mean (1) any equipment following in series another piece of control equipment designed to remove the same pollutant, or (2) a control device designed for one pollutant that affects the removal of another pollutant. When a piece of equipment incidentally removes pollutants other than those for which it was normally intended, the code should be entered in the secondary control field on the NEDS form under the pollutant which it incidentally removes. When the above situation occurs, the control device would be entered in the secondary control field with zeros in the primary control field. If no secondary control devices are installed, enter a zero in each column. Engineering judgment must be used to ascertain whether a given control device significantly reduces the emissions of more than one pollutant.

4. Estimated Control Efficiency: The overall collection efficiencies in weight percent of all control equipment at the point source should be entered for each of the five pollutants. Assume that the pollutant load entering the control equipment is the normal, uncontrolled quantity for that specific process. If removal efficiency for a particular pollutant is unknown, leave that space blank; if there is no effective removal, then enter a zero in the column.

4.6 OPERATING INFORMATION AND EMISSION ESTIMATES

Card 4 contains data on the operating schedule of the source as well as the estimated annual emissions from that source. This information is required to determine the release of pollutants on a seasonal, monthly, or time-of-week basis. Such data are valuable to an enforcement agency in properly selecting an effective air pollution control strategy.

Card 4 - Emission Estimates

Spaces	Format	Symbol	Description	Units
16-17	XX	Numerical	Year of Record	-
18-19	XX	Numerical	Percent of Annual Throughput (Dec., Jan., Feb.)	%
20-21	XX	Numerical	Percent of Annual Throughput (Mar., Apr., May)	%
22-23	XX	Numerical	Percent of Annual Throughput (June, July, Aug.)	%
24-25	XX	Numerical	Percent of Annual Throughput (Sept., Oct., Nov.)	%
26-27	XX	Numerical	Normal Operating Hours per Day	hr
28	X	Numerical	Normal Operating Days per Week	da
29-30	XX	Numerical	Normal Operating Weeks per Year	wk
31-37	XXXXXXX	Numerical	Emissions Estimate - Particulate	T/yr
38-44	XXXXXXX	Numerical	Emissions Estimate - SO_x	T/yr
45-51	XXXXXXX	Numerical	Emissions Estimate - NO_x	T/yr
52-58	XXXXXXX	Numerical	Emissions Estimate - Hydrocarbons	T/yr
59-65	XXXXXXX	Numerical	Emissions Estimate - CO	T/yr
66	X	Numerical Coding	Method of Estimating Particulate Emissions	-
67	X	Numerical Coding	Method of Estimating SO_x Emissions	-
68	X	Numerical Coding	Method of Estimating NO_x Emissions	-
69	X	Numerical Coding	Method of Estimating Hydrocarbon Emissions	-
70	X	Numerical Coding	Method of Estimating CO Emissions	-
71-73	XX.X	Numerical	Portion of Fuel Used for Space Heat	%

1. Year of Record: The last two digits of the calendar year that the data on card 4 represent should be entered here.

2. Percent of Annual Throughput: The annual production, consumption, throughput, or other valid number representing the operating of the source should be proportionally divided into the four 3-month categories shown on the coding form. The weighted portion of production occurring in each category is reported as a percentage of the total annual throughput. For example, if a boiler operates only during the months of December, January, and February, then 99 percent would be entered in the appropriate column.

3. Normal Operating Time: The hours per day, days per week, and weeks per year that the source operates under normal and usual conditions should be entered here. It should be emphasized that this column refers to activity of the point source, not of the entire facility. For example, an industrial boiler in a plant may be operating 7 days a week even though the plant may be shut down on Saturdays and Sundays. In this case, the number 7 should be entered in the appropriate space for days per week. If the source is operating at more than 25 percent of its normal rate, consider the source to be fully operating during that time period. If production is less than 25 percent of the normal rate, consider the source as not operating during that time period.

4. Emission Estimates: The annual, controlled emissions from the point source, in tons per year, should be entered here. These calculations should include the effect of pollutant removal by installed control equipment.

5. Method of Estimating Emissions: The following code list must be used to specify the method used to ascertain the emissions reported in columns 66 through 70:

Code	Description of Method
0	Not applicable (if emissions are negligible)
1	Stack-test results or other emission measurements
2	Material balance using engineering knowledge and expertise of process
3	Emissions calculated using emission factors
4	Guess

6. Portion of Fuel Used for Space Heating: An estimate of the percent of total fuel used for space heating at the plant should be entered here. If no fuel is used for space heating, enter zero in this column.

4.7 COMPLIANCE ANALYSIS

Allowable emissions and compliance schedules for the source are recorded on card 5. All entries are to reflect the current legal requirements of the source to comply with the most stringent air pollution control regulations in effect.

1. Year of Record: The last two digits of the calendar year that the data on card 5 represent should be entered here.
2. Allowable Emissions: Entered here should be the maximum emissions of each pollutant, in tons per year, that the source is legally allowed to discharge into the atmosphere under the most stringent of the following conditions:

   a. Existing local, state, or Federal legislation.

   b. Imminent legislation that will legally require the source to comply to a certain discharge limitation within the year of record specified in columns 16 and 17.

   c. Official agreements with air pollution control regulatory agencies whereby the source must reduce emissions to a given quantity per year within the year of record specified in columns 16 and 17.

   Allowable emissions should be calculated in the same manner as intended by the most stringent laws affecting the source. For example, if allowable emissions are 5 pounds SO_2 per ton of daily production, then an average annual production should be estimated and multiplied by the 5 pounds SO_2 factor to calculate the annual quantity of SO_2 allowed to be emitted to the atmosphere. If allowable emissions are unknown, leave the spaces blank.

3. Source-Compliance Status: Air pollution control enforcement agencies often allow sources of air pollution an extended, but definite, period of time to design and install air pollution control equipment. This act of leniency is referred to as a "variance;" if the source succeeds in reducing its emissions by the required date, then the law has been satisfied and the source has met its pollution control obligation. One of the following codes must be selected to record the present status of the source under existing legal requirements.

Code	Description
1	Source is in compliance with the most stringent air pollution control requirements.
2	Source is not in compliance with existing legislation and no variance has been given. (Complete columns 54 through 57 on card 5.)

Code	Description
3	Source is not in compliance with existing legislation but a variance has been given. (Complete columns 54 through 57 on card 5.)
4	Compliance status is unknown.

Card 5 - Compliance Analysis

Spaces	Format	Symbol	Description	Units
16-17	XX	Numerical	Year of Record	-
18-24	XXXXXXX	Numerical	Allowable Emissions - Particulate	T/yr
25-31	XXXXXXX	Numerical	Allowable Emissions - SO_x	T/yr
32-38	XXXXXXX	Numerical	Allowable Emissions - NO_x	T/yr
39-45	XXXXXXX	Numerical	Allowable Emissions - Hydrocarbons	T/yr
46-52	XXXXXXX	Numerical	Allowable Emissions - CO	T/yr
53	X	Numerical Coding	Source Compliance Status	-
54-55	XX	Numerical	Year Source Must Be in Compliance (complete only if compliance status = 2,3)	-
56-57	XX	Numerical	Month Source Must Be in Compliance (complete only if compliance status = 2,3)	-
58-59	XX	Numerical	Year of Compliance Status Update	-
60-61	XX	Numerical	Month of Compliance Status Update	-
62-63	XX	Numerical	Day of Compliance Status Update	-
64	X	Numerical Code	Emergency Control Action Program (ECAP) Status	-
65-68	XXXX	Numerical Code	Control Regulation No. 1	-
69-72	XXXX	Numerical Code	Control Regulation No. 2	-
73-76	XXXX	Numerical Code	Control Regulation No. 3	-

4. Year and Month Source Must be in Compliance: These columns should be completed only when code 2 or code 3 is entered in column 53. If codes 1 or 4 are entered in column 53, then these spaces should be left blank.

5. Time of Compliance Update: The day, month, and year of the most recent change in compliance status for the source should be entered in these columns. Leave spaces blank if compliance status has been reported as unknown. If the source is in compliance with existing air pollution control legislation, then record the time that such legislation was enacted.

6. Emergency Control Action Program (ECAP): Certain point sources are required to submit to government agencies an ECAP that specifies a detailed plan for immediately reducing emissions whenever air pollution in an area is considered an emergency condition. The following list shall be used to denote whether or not an ECAP has been submitted to an appropriate government agency. Leave blank if status is unknown.

Code	Description
0	ECAP is not required.
1	ECAP is required but has not been submitted.
2	ECAP has been submitted.

7. Control Regulations: Spaces 65 through 76 are used to identify air pollution control regulations that are in effect and apply to the source. This information will augment the Comprehensive Data System (CDS), developed by Division of Stationary Source Enforcement and will be included in the Variable Data Subsystem (VDS) of NEDS.

4.8 FUEL, PROCESS, OR SOLID-WASTE INFORMATION

The operating characteristics of the source are defined on card 6. Because there may be many functionally separate processes that discharge exhaust gases into the same stack, a standard procedure was developed to report and retain such data. The instructions that apply to this procedure are as follows: (1) Cards 2 through 5 on the coding form contain data pertinent to an individual point of emission within the facility that can be geographically separated from other emission points; and (2) There are five cards 6 on each coding form to record up to five separate processes that may be contributing to the exhaust gases discharged from a particular emission source. To report two or more units on one coding form where exhaust gases from two or more driers are discharged into a single stack, the units must have the same SCC. One card 6 would be completed showing the SCC, the combined annual operating rate, the combined maximum design rate, and the number of combined units in "Comments." If the combustion gases for the driers are discharged into the same stack, additional cards 6 must be completed for each type of fuel. Similarly, if one boiler uses coal, fuel oil, and natural gas as fuel, then three of the five cards 6 should be completed.

1. Year of Record: The last two digits of the calendar year that the data on card 6 represent should be entered here.
2. Source Classification Code (SCC): The SCC process description in the Source Classification Code, Appendix A, Section 2, that most nearly describes the process should be entered by its eight-digit numerical code. Note that multiple cards 6 are to be completed only if the SCC codes are not identical. If the most appropriate SCC description appears to be significantly different from the actual process, use SCC codes ending in 9999999, 99999, or 99 and include a brief, intelligible description of the process and the rate units in the "Comments" section. Use only the "Comments" field available on the card.

Card 6 - Fuel, Process, and Solid-Waste Data

Spaces	Format	Symbol	Description	Units
16-17	XX	Numerical	Year of Record	-
18-25	XXXXXXXX	Numerical Code	Source Classification Code (SCC)	-
26-32	XXXXXXX	Numerical Code	Annual Charging Rate of Fuel Process or Solid Waste	(SCC)*/yr
33-39	XXXX.XXX	Numerical Code	Maximum Hourly Design Rate	(SCC)*/yr
40-42	X.XX	Numerical	Sulfur Content	%
43-45	XX.X	Numerical Code	Ash Content	%
46-50	XXXXX	Numerical Code	Heat Content, Millions of Btu	(SCC)*
51-70	A-A	Alphabetical	Comments	-
71	A	Alphabetical	Source Code	-
72	X	Numerical	Confidentiality of Data	-

* Note: Each of the code columns above that specify a numerical code symbol requires reference to and use of the Source Classification Code (SCC), Appendix A, Section 2.

3. Annual Charging Rate of Fuel, Process, or Solid Waste: The units in which the charging rates must be expressed are listed for each SCC in Appendix A, Section 2. The average annual operating rates will be reported and entered in the columns in those units given in Appendix A that correspond to the appropriate SCC of the process. Thus, for coal combustion, the process rate is expressed in tons of coal burned per year, whereas, when oil is burned, the units are thousands of gallons burned per year.

4. Maximum Hourly Design Rate: The maximum hourly design rate of the most important process equipment, or the upper operating limit that generally would not be exceeded in normal practice, should be entered here. Units are expressed in those corresponding to the SCC for the process. The maximum hourly design rate for boilers will be calculated by dividing the fuel heat content into the boiler design capacity. (Note that design quantities are expressed in hourly operating rates, and that a decimal point is positioned in this field. Location of the decimal point is based on the relationship of hourly capacity to annual process rate contained in the previous field.)

5. Sulfur and Ash Contents: Entries are to be made in these columns for all combustion processes. If the process does not burn fuel, then enter zeros in columns 42 and 45. Leave spaces blank if the process uses combustion but the sulfur or ash contents of the fuel are unknown. Enter zeros to denote nonapplicability for solid waste processes unless the waste has high or unusual sulfur content.

6. Heat Content: This column is to be completed only when the process involves combustion. If the process does not involve combustion, enter a zero in column 50 to denote nonapplicability. Units are millions of Btu per SCC. Thus, for natural gas combustion the number entered would be as follows: (10^3 Btu/cubic foot) (10^6 cubic feet/SCC) / 10^6 = 1000.

7. Comments: The operating characteristics of most sources are defined by a single SCC and associated data on one card 6; therefore, only the "Comments" field (columns 51 through 70) of tne one card 6 is available for recording comments. Comments may not be entered on a non-existent card 6, one which has no Source Classification Code. Comments must relate to the corresponding SCC. When the SCC is general (e.g., ending in 99), a description of the process and rate units must be reported. Abbreviated comments must be intelligible. Useful notes pertaining to the source may be written on the back of the coding form.

8. Source Code: A quick visual check of the process category reported on card 6 is useful. Use the following list and enter the appropriate code in this column:

Code	Description of Source
B	Boiler
P	Process
C	Other combustion unit
S	Solid waste

9. Confidentiality of Data: Process information occasionally is collected by a government agency under a guarantee that the data will be treated in a confidential manner and will not be released to the public. This column specifies whether or not any data on cards 2 through 6 are officially considered confidential. Use the following list to select the appropriate code number. Leave the space blank if confidentiality status is unknown.

Code	Description
1	Some data on cards 2 through 6 are confidential.
2	No information on the coding form is confidential.

4.9 SUPPLEMENTARY INSTRUCTIONS

1. The NEDS point source coding form may not be changed. Data other than those described by field headings may not be entered in those fields. The columns on the coding form which have no heading must be left blank.

2. Rules for entering codes and data in the point source form:

   a. The following parameters are defined as both numeric and alphabetic:

Parameter	Card Columns
Card 1	
Establishment name and address	22 - 61
Contact - personal	62 - 73
Card 5	
Control Regulation 1	65 - 68
Control Regulation 2	69 - 72
Control Regulation 3	73 - 76
Card 6	
Comments	51 - 70

Any of the above defined card columns may be filled out or left blank. Embedded and leading blanks are allowed.

b. All parameters and card columns not covered in the above paragraph or in section 4.2.10 are defined as numeric only. For each of these parameters all blanks or leading blanks are allowable; embedded blanks are not. Each is right-justified. The following examples should clarify these rules.

Maximum design rate

	33	34	35	36	37	38	39	
All blanks				▲				Allowed
Leading blanks				▲			0	Allowed
Leading blanks				2 ▲	4	0	1	Allowed
Embedded blanks				0 ▲				Not allowed
Embedded blanks				0 ▲		4	2	Not allowed

3. A source within a facility that has uncontrolled emissions of less than 1 ton per year of any pollutant, and that cannot be combined with like small sources normally will not be reported on a coding form.

4. Combining like process units: If a facility has a number of identical process units each of which has a low level of emissions, the units should be combined into one effective source reported on one coding form. If the units have separate stacks, stack data for one typical stack should be entered on the form and the number of stacks should be reported in comments.

5. Stack data coding:

   a. Where two or more sources discharge into a common stack and each source is coded on a separate coding form, enter the actual stack height, diameter, and temperature on each coding form. Enter only the exhaust-gas flow discharged by the single source (boiler or process) described by the coding form.

   b. Where two or more like sources that would have an identical SCC discharge through separate but similar stacks are combined into one effective source, stack data (height, diameter, temperature, and flow) for one typical stack is entered in the coding form. The number of combined units is reported in the comments. Paragraph 4.2.10 describes a method of selecting a typical stack by means of a formula.

6. Boiler design capacity: These columns, 18 through 22, on card 3 are for boilers exclusively. For other combustion units, enter a single zero in column 22 to indicate not applicable.

7. It is very important to report the correct method of emissions estimation. Emissions determined by stack tests are very valuable; therefore, the use of code 1 to report stack tests must be reliable.

8. Identical SCC's may not be entered on a source coding form.

9. When a number of boilers or process units have been combined to make an effective single source coded on one point source form, this must be reported in comments by recording the number of combined units (e.g., 6 Blrs, 6 Stacks).

4.10 NEDS VARIABLE DATA SUBSYSTEM

1. The Need for a Variable Data Subsystem

   As described in Section 4.1 and paragraph 4.2.7, one NEDS point source coding form must be completed for each point source in the U.S. using specific instructions and coding lists. The coding form (containing computer cards 1 through 6) is basic input to the NEDS system and with NEDS programming software and other data files (i.e., area sources, emission factors) provides the first standardized method for gathering and retrieving national source inventory data. Thus, a major advantage of this concept is the inherent uniformity of data collection, storage, and retrieval that it provides to users of the data base.

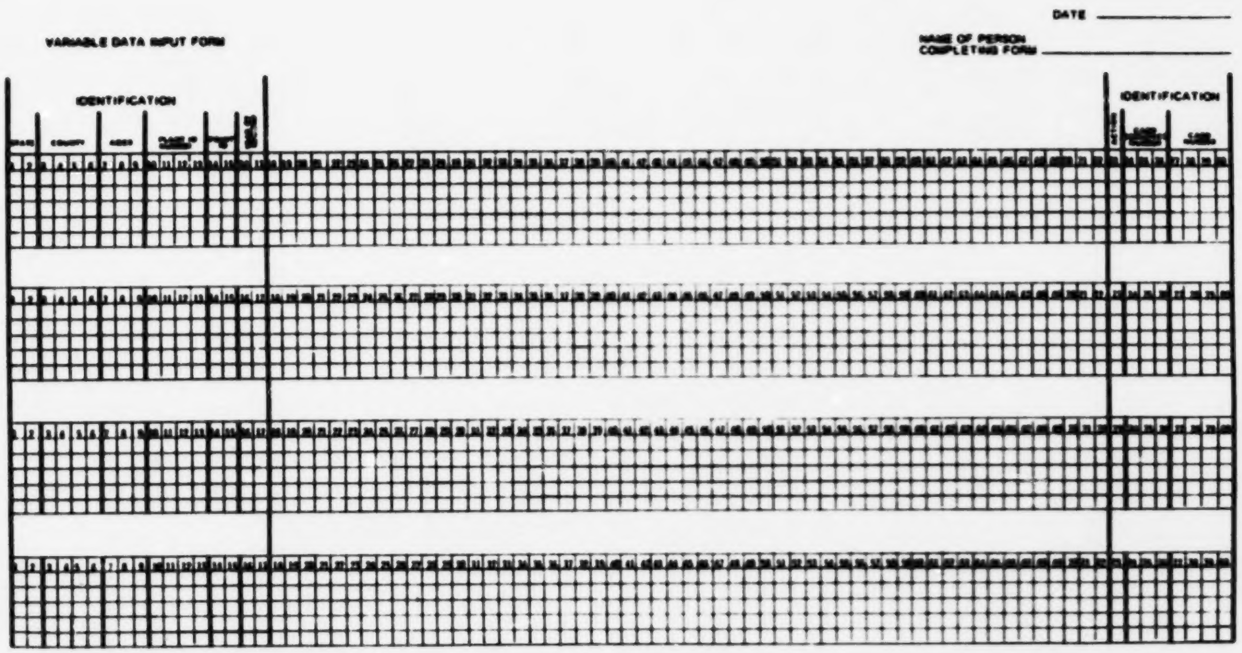
   After extensive coordination with EPA Regional Offices and numerous state and local agencies, it became apparent that many pollution control agencies require additional data on each point source within their jurisdiction--information which is supplemental to data recorded on the basic NEDS coding form. Furthermore, the content and the format of the desired supplemental data vary greatly among individual states and among local agencies within each state.

   The variable data subsystem (VDS) was developed specifically to provide a mechanism for rationally expanding the NEDS data base so that a variety of data relating to each emission source can be added to the information recorded on the basic NEDS coding form for each point source. Thus, the VDS system allows all pollution control agencies at any governmental level to record and store additional data about point sources even though such data are unique to their own particular program. For example, permit numbers, fees, expiration dates, and other data relating to any point source can be directly connected to the basic NEDS data base via the VDS subsystem.

2. Description of the Variable Data Subsystem

   VDS is primarily composed of two parts:

   a. The variable data subsystem (VDS) coding forms shown in Figure 4-2 and related instructions.



VARIABLE DATA INPUT FORM

DATE ______________

NAME OF PERSON COMPLETING FORM ______________

IDENTIFICATION
STATE
COUNTY
AQCR
IDENTIFICATION

* CARD COLUMN 77 MUST BE ALPHABETIC

EPA (DUR) 243

Figure 4-2. Variable data input form.

b. Computer storage of the additional data, including software and hardware capabilities. If requested, EPA will provide the computerized storage of the VDS data. In preparation for the expected response to this offer, the computer storage capability for the additional data is presently being developed by the National Air Data Branch and is scheduled for completion by July 1973.

The VDS coding form is divided into three sections:

a. The Identification Section, which directly connects data on the VDS form with information contained on the basic NEDS coding form for the particular point source.

b. A variable data field containing 55 blank spaces per card. Content and format of these spaces are designed exclusively by the originating agencies according to their needs.

c. The Card Identification Section, which contains a specific, four-digit number assigned by NADB to each VDS coding form. This number is the base of an indexing system for computerized data storage and retrieval.

The methodology developed for the VDS card identification section is explained in detail since it is extremely important that users completely understand this concept.

The VDS coding form contains 20 blank cards, each of which has one four-digit card number (77 through 80) that is common to the entire coding form and one three-digit card sequence number (74 through 76) that is different for each card on the coding form. The four-digit card number corresponds to one, defined card format (the fields that are used to record specific information on the cards) and is assigned by NADB. The designated card number, together with the unique coding format associated with that number, allows NADB to provide the originating agency with computer storage of the data. The card sequence number, on the other hand, is designated by the user of the VDS cards to differentiate between multiple cards (for each source) having the same format.

The usefulness of the card numbering system explained above can perhaps be better explained by describing the trace materials coding form (Chapter 6) that has been developed as the first card in the Variable Data Subsystem. The purposes of the trace materials coding form are to record emissions of trace materials and to record other plant parameters that relate to each source discharging toxic materials into the atmosphere. The content and format of the desired data was first defined and fitted into the variable data field (spaces 18 through 72) of a blank VDS form. A card number of A001 was then assigned to the VDS form by NADB. This directly connected A001 to the basic NEDS coding form for each point source.

Card sequence numbers are assigned to each card in the following manner for any particular source:

a. If one trace material (e.g., mercury) is emitted from the source, only one card on the entire coding form is completed and a card sequence number of 001 is entered into spaces 74 through 76.

b. If two or more trace materials are emitted from the source, one card is completed for each of the pollutants and each card is assigned a separate card sequence number (001, 002, etc.).

It must be emphasized that all data recorded on any VDS form augments the data recorded on the basic NEDS coding form for that source. That is, the VDS form supplements but does not replace the basic NEDS coding form and there must always be a basic NEDS form completed for the point source.

3. The Variable Data Subsystem Input Form

Card Spaces	Format	Symbol	Description	Units
IDENTIFICATION SECTION				
1 - 2	XX	Numeric	State Coding Number	-
3 - 6	XXXX	Numeric	County Coding Number	-
7 - 9	XXX	Numeric	AQCR Number	-
10 - 13	XXXX	Numeric	Plant Source Number within the County	-
14 - 15	XX	Numeric	Point Source Number within the Plant	-
16 - 17	XX	Numeric	Year of Record	-
VARIABLE DATA FIELD				
18 - 72 - Data content and format to be specified by originating agencies.				
CARD IDENTIFICATION SECTION				
73	X	Alphabetic	Computer Action Code	-
74 - 76	XXX	Numeric	Card Sequence Number	-
77 - 80	XXXX	Alphabetic numeric	Card Number	-

a. Identification (spaces 1 through 17): Enter the same coding numbers that are recorded on the basic NEDS coding form for the point source. Entries must be made in all of the spaces 1 through 17.

b. Variable data field (spaces 18 through 72): Enter data in the format specified by the originating agency. All or part of available spaces on each card can be utilized. However, the finalized format for each VDS form must be sent to NADB so that computer storage of the data can be properly arranged and arrangements made to provide the information to the originating agency.

c. Card identification section

(i) Action code (space 73): Enter one of the following code letters in this space:

Code	Description
A	Add data to NEDS file.
C	Change. (Delete old data and insert the new data into the NEDS file.)
D	Delete data in the NEDS file.

(ii) Card sequence number (spaces 74 through 76): For each card used on the VDS coding form, enter a card sequence number beginning with 001 and ending with the total number of VDS cards used for any given format. Up to 999 card sequence numbers can be assigned. The first sequence number relating to each individual point source must be 001. That is, every time the VDS card has a new plant or point source coding number in spaces 10 through 15 then the card sequence number is 001.

(iii) Card number (spaces 77 through 80): Upon request by an EPA Regional Office, NADB will assign one alphanumeric, four-digit card number to each VDS coding form. This need only be done once for any given card format regardless of how many actual coding forms of that format are being used.

4. The Variable Data Subsystem Applied to Area Sources

The VDS form can be directly used to supplement data recorded on the NEDS area source coding form which is described in Chapter 5 of the NEDS Manual. All previous instructions in this section for point sources are applicable to expanding the area source data file with one exception: the spaces for plant and point identification numbers (columns 10 through 15 on the VDS form) must all be blank.

4.11 REFERENCES

1. SAROAD Station Coding Manual for Aerometric Sampling Networks. U.S. Environmental Protection Agency, Office of Air Programs. OAP Publication No. APTD-0907. Research Triangle Park, North Carolina. February 1972.
2. Standard Industrial Classification Manual. U.S. Bureau of the Budget, Office of Statistical Standards. Washington, D.C. 1972.

5. AREA SOURCE CODING

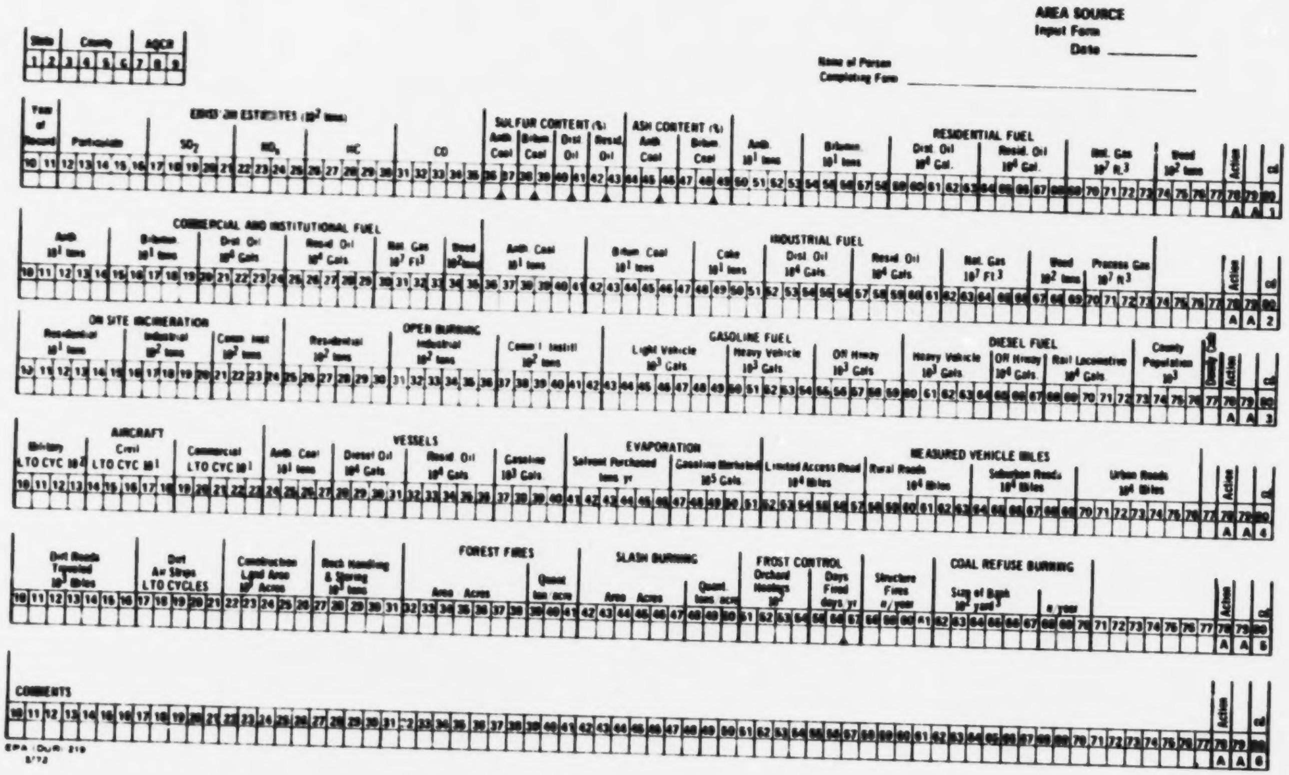
5.1 IDENTIFICATION OF AREA SOURCE

This chapter presents techniques to be used both for estimating area source quantities and for completing the area source coding form shown in Figure 5-1. The chapter subsections devoted to each area source category include a brief description of the source category, discuss the data collection methods that are to be used to obtain area source totals, and state how to fill out the area source coding form and how to apportion the county totals to the proper source categories. Also, general guidelines concerning the proper application of the methods are given.

An important point to remember is that an area source actually represents a collection of many small sources. Each small source may emit only very small quantities of air pollutants, but, because of the great number of small sources, their collective impact may be very significant. The object of area source calculations is to obtain an accurate estimate of this collective contribution to total emissions. Such an estimate can never be exact, however, because it would be impossible to determine the emissions from every small source individually. For instance, it would be impossible to monitor continuously every automobile in the study area and determine the total emissions from automobile operation by adding up the individual totals. Hence, the emissions from sources too small or too difficult to be surveyed individually have to be reported collectively as "area sources." In the area source format, each county or county equivalent (parish, census division, independent city, etc. for states where counties are not used) is defined as the smallest region for which area sources are calculated. In areas where detailed modeling of air quality data is desirable, the format will accommodate subdivision of counties into UTM-based grid zones for processing. (County area source totals can be apportioned to grid zones according to the procedures discussed in this chapter.)

5.2 COUNTY INFORMATION (COLUMNS 1 THROUGH 9 OF ALL CARDS; COLUMNS 10 AND 11 OF CARD 1; AND COLUMNS 73 THROUGH 77 OF CARD 3)

Each area source is uniquely identified by a two-digit code identifying the state, a four-digit code identifying the county, and a three-digit code identifying the AQCR. The proper codes defined by the SAROAD system[1] can be found from the Geographical Identification Code in Appendix A, Section 1 and in the SAROAD Station Coding Manual.[1] The year the data represent should be entered in spaces 10 and 11 of card 1. The county population and the population distribution code should be



AREA SOURCE
Input Form
Date ____________

Name of Person Completing Form ____________

State | County | AQCR
1 2 | 3 4 5 6 | 7 8 9

Year of Record | EMISSION ESTIMATES (10^2 tons): Particulate | SO_2 | NO_x | HC | CO | SULFUR CONTENT (%): Anth Coal | Bitum Coal | Dist Oil | Resid Oil | ASH CONTENT (%): Anth Coal | Bitum Coal | RESIDENTIAL FUEL: Anth. 10^1 tons | Bitumin. 10^1 tons | Dist. Oil 10^4 Gal. | Resid. Oil 10^4 Gal. | Nat. Gas 10^7 ft.^{3} | Wood 10^2 tons | Action | cd — A A 1

COMMERCIAL AND INSTITUTIONAL FUEL: Anth 10^1 tons | Bitumin 10^1 tons | Dist Oil 10^4 Gals | Resid Oil 10^4 Gals | Nat Gas 10^7 Ft^3 | Wood 10^2 tons | INDUSTRIAL FUEL: Anth Coal 10^1 tons | Bitum Coal 10^1 tons | Coke 10^1 tons | Dist Oil 10^4 Gals | Resid Oil 10^4 Gals | Nat. Gas 10^7 Ft^3 | Wood 10^2 tons | Process Gas 10^7 ft^3 | Action | cd — A A 2

ON SITE INCINERATION: Residential 10^1 tons | Industrial 10^2 tons | Comm Inst 10^2 tons | OPEN BURNING: Residential 10^2 tons | Industrial 10^2 tons | Comm'l Instit'l 10^2 tons | GASOLINE FUEL: Light Vehicle 10^3 Gals | Heavy Vehicle 10^3 Gals | Off Hiway 10^3 Gals | DIESEL FUEL: Heavy Vehicle 10^3 Gals | Off Hiway 10^4 Gals | Rail Locomotive 10^4 Gals | County Population 10^3 | Density | Action | cd — A A 3

AIRCRAFT: Military LTO CYC 10^2 | Civil LTO CYC 10^1 | Commercial LTO CYC 10^1 | VESSELS: Anth Coal 10^1 tons | Diesel Oil 10^4 Gals | Resid Oil 10^4 Gals | Gasoline 10^3 Gals | EVAPORATION: Solvent Purchased tons yr | Gasoline Marketed 10^5 Gals | MEASURED VEHICLE MILES: Limited Access Road 10^4 Miles | Rural Roads 10^4 Miles | Suburban Roads 10^4 Miles | Urban Roads 10^4 Miles | Action | cd — A A 4

Dirt Roads Traveled 10^3 Miles | Dirt Air Strips LTO CYCLES | Construction Land Area 10^2 Acres | Rock Handling & Storing 10^3 tons | FOREST FIRES: Area Acres | Quant. ton/acre | SLASH BURNING: Area Acres | Quant. tons acre | FROST CONTROL: Orchard Heaters 10^2 | Days Fired days yr | Structure Fires #/year | COAL REFUSE BURNING: Size of Bank 10^2 yard^3 | #/year | Action | cd — A A 5

COMMENTS | Action | cd — A A 6

EPA (Dur) 219
5/72

Figure 5-1. Area source coding form.

entered in spaces 73 through 77 of card 3. The county population, to the nearest thousand, must be determined from the 1970 Census of Population.[2] This publication also gives the urban-rural population breakdown. Using this information, the correct population distribution code should be entered according to the designations below.

Population Distribution Code	Population Breakdown
0	<10% urban
1	10 - 20% urban
2	20 - 30% urban
3	30 - 40% urban
4	40 - 50% urban
5	50 - 60% urban
6	60 - 70% urban
7	70 - 80% urban
8	80 - 90% urban
9	>90% urban

5.3 EMISSION ESTIMATES (COLUMNS 12 THROUGH 35, CARD 1)

The most recent emission estimates, in hundreds of tons per year, should be entered. Such estimates should be obtained either from the state's implementation plan emission inventory or from a more recent inventory, if available. Rounding off emission totals to hundreds of tons does not sacrifice accuracy. Nearly every county will have emissions of at least 100 tons of each of the five major pollutants. A figure of 100 tons is also the smallest significant figure that can be reported for emission totals. The units shown for each of the area source quantities on the coding form are such that emissions can be reported down to the order of magnitude of 1 ton. The precision of emission factors and the data to which these factors are applied does not justify reporting countywide emissions of less than 100 tons.

5.4 FUEL DATA (COLUMNS 46 THROUGH 49, CARD 1)

The percent sulfur and ash contents entered here are necessary for calculation of sulfur oxide and particulate emissions from fuel combustion. The figures entered should be weighted averages for the fuels consumed by area sources. For instance, if the bituminous coal sulfur contents and fuel consumption totals are as follows:

Residential: 1000 tons, 1.4 percent sulfur
Commercial-institutional: 500 tons, 1.6 percent sulfur
Industrial: 1500 tons, 2.0 percent sulfur

Then the weighted average sulfur content is calculated as follows:

$$\begin{array}{rcl} 1000 \times 1.4 & = & 1400 \\ 500 \times 1.6 & = & 800 \\ \underline{1500} \times 2.0 & = & \underline{3000} \\ 3000 & & 5200 \end{array}$$

The average sulfur content = $\frac{5200}{3000}$ = 1.73 percent.

Some areas have regulations limiting the sulfur content of fuels. If, for instance, no bituminous coal with a sulfur content of more than 1.5 percent can be burned, and if it is known that no significant amount of coal with a sulfur content of less than 1.5 percent is burned, then the weighted average sulfur content for bituminous coal can be assumed to be 1.5 percent. The figures entered on the form must represent the fuel that is actually being used, however, and not the fuel that is supposed to be used or that will be used at some time in the future. One set of weighted-average fuel factors is assumed to be adequate for each fuel being used in the county. The figures for each source category that may be found are also averaged numbers. The main concern is to obtain one set of fuel factors that will permit accurate countywide emission estimates to be calculated.

5.5 STATIONARY SOURCE FUEL CONSUMPTION (COLUMNS 50 THROUGH 77, CARD 1; AND COLUMNS 10 THROUGH 77, CARD 2)

The quantity of fuel consumed by each source category must be ascertained. The source categories are as follows:

1. Residential: This category includes all residential dwellings, from single-family residences to multi-story apartment complexes.
2. Commercial-institutional: This category includes retail and wholesale stores, schools, hospitals, government buildings, and other public buildings.
3. Industrial: This category includes all manufacturing industries with emissions too small to qualify as point sources.

Collectively, the three categories above account for all the stationary fuel combustion activities that are not usually reported as point sources. The breakdown into source categories is necessary to show how each type of fuel combustion activity contributes to the total air pollutant emissions. Such information is very useful and often essential for the formulation of control strategies to achieve air quality goals.

The six major fuels and three generally less important fuels that may be consumed by area sources are listed below.

5.5.1 Major Fuels

5.5.1.1 Anthracite Coal[3] - Anthracite, or hard coal, is produced almost exclusively in Pennsylvania and is available in significant quantities only in states that are within easy shipping distance from Pennsylvania. Anthracite may be consumed by all source categories, although most is used by residential sources.

5.5.1.2 Bituminous Coal[3] - Because production of bituminous coal is more widespread than production of anthracite, the former is available in most areas of the country. Also included as bituminous coal are the lower grades of sub-bituminous coal and lignite. Bituminous coal is often favored for use by electric utilities, manufacturing industries, and coke producers. Bituminous coal is used in some areas for residential and commercial-institutional heating.

5.5.1.3 Distillate Oil[4] - Distillate oil includes fuel oil grades 1, 2, and 4. In addition, diesel fuel and kerosene can be considered distillate-type oils. Nationwide, residential and commercial-institutional sources are the largest consumers of distillate oil.

5.5.1.4 Residual Oil[4] - Residual oil includes fuel oil grades 5 and 6. In most areas residual oil is not used by residential sources, but significant amounts may be consumed by industrial and commercial-institutional users.

5.5.1.5 Natural Gas[5] - Natural gas, consisting principally of methane but containing other hydrocarbon gases as well, is used in significant amounts by all source categories.

5.5.1.6 Wood - Wood may be used as heating fuel by residential sources (primarily in rural areas where wood is readily available), by industrial sources, and by commercial-institutional sources (usually in very small amounts). The chief industrial users of wood as heating fuel are those wood-processing industries such as sawmills, plywood mills, and furniture manufacturers that generate large amounts of wood waste that can be consumed in boilers.

5.5.2 Minor Fuels

5.5.2.1 Liquefied Petroleum Gas - Liquefied petroleum gas (LPG) consists of higher-carbon-number hydrocarbons such as propane and butane.[6] The contribution from LPG combustion to total emissions is not significant in most areas. Where LPG use is considerable, however, it should be recorded as "equivalent natural gas" according to the procedure described later in this chapter. Should LPG use become more widespread in the future, the format will be expanded by designating separate spaces or adding new cards to accommodate LPG consumption. At present, it is not necessary to report LPG use in many areas, however.

5.5.2.2 Coke - Coke is made by destructive distillation of coal to remove the volatile components.[3] Although primarily used by the iron and steel industry, some coke may appear as an industrial area source fuel.

5.5.2.3 Process Gas - Process gas, or "sour gas" as it is sometimes termed, is often used at petroleum and petro-chemical refining operations as well as at natural gas production plants. Process gas, which is usually characterized by a high sulfur content and relatively low heat content, cannot be marketed commercially. In addition, "coke gas," the gaseous product of destructive distillation of coal, has some heating value and may be used industrially.

5.5.3 Estimating Area Source Fuel Consumption

Either of two methods can be used for estimating the quantity of fuel consumed in an area.

5.5.3.1 Local Fuel Dealers Method - Most fuel retailers maintain sales records that can be a valuable source of information for the determination of area source fuel consumption. The information needed from fuel dealers concerns their annual sales by county to each source category. The area source totals of residential and commercial-institutional fuel consumption are then simply the fuel dealers' figures minus any fuel consumed by point sources included in these source categories. Because dealer sales to industrial users may not adequately represent the amount of fuel consumed by industrial sources, the second method is primarily used for industrial fuel determination. Any information gained from fuel dealers would be useful, however.

It is important that all fuel dealers be contacted. The accuracy of the survey results will be significantly reduced if some fuel dealers are overlooked. It may be that not all fuel dealers will be able to furnish adequate information. In the past, natural gas dealers have been best able to furnish the required data. Other dealers either have been reluctant to release information, or simply have not had the detailed breakdowns required. There is no assurance that fuel dealer sales accurately represent fuel consumption, either. Sales of coal to industrial sources or of wood to residential sources, for instance, may represent only a part of the total fuel consumed, because much of the fuel consumed may not come from retail dealers. The second method below should be used for those cases in which fuel dealers cannot provide the detailed breakdowns of total fuel sales by county. It should be emphasized, however, that information provided by dealers, although perhaps incomplete, can provide insights into fuel use patterns that would not be discovered by the second method.

5.5.3.2 Bureau of Mines Published Data Method - The Bureau of Mines of the U. S. Department of the Interior publishes annual data on fuel sales and distribution. The advantages to the use of this information are that the data are reported nationwide, are readily available because they are published, and are updated every year. The drawback to the use of this material is that fuel data are reported by states only, and often are not broken down into the desired source categories. County totals must be estimated by apportioning state totals. This geographical apportioning step, which is not necessary for the fuel dealers method, decreases the accuracy by which area source fuel totals can be determined. The geographical apportioning techniques are discussed in the next section.

5.5.4 Apportioning Fuel Consumption

To complete the area source form, the county fuel consumption totals must be assigned to the proper source categories. If fuel dealers furnish county totals by source category, no problems are involved; but if only county sales totals can be obtained from fuel dealers or if Bureau of Mines data must be used, then apportioning techniques are required. Geographical apportioning techniques for use with Bureau of Mines figures, and source category apportioning techniques for use with either data collection method will be discussed.

5.5.4.1 Geographical Apportioning Techniques - Techniques for apportioning state totals to counties are to be used for each source category. It should be noted that these apportioning techniques are appropriate for use with area source fuel totals only, and should not be used to apportion to counties the grand total amount of fuel used in a state (which is the point source total plus the area source total). Fuel used by point sources will be assigned to counties based on the grid coordinates of the sources. It should be understood that when references are made in this chapter to "state totals" or "county totals," these terms refer only to the total amount of fuel consumed by area sources. Some of the coal data given by the Bureau of Mines are reported for groups of states only.[3] To separate the group total into individual state totals, the group total should be distributed to states according to the same method used to distribute a state total to counties.

5.5.4.1.1 Residential fuel use - State totals for residential fuel use can be apportioned to counties by the number of dwelling units using each fuel per county. Dwelling unit information is available from the 1970 Census of Housing[7] and should be applied according to the following formula:

$$\text{County residential fuel total} = \text{State residential fuel total} \times \frac{\text{County dwelling units}}{\text{State dwelling units}}$$

The county and state dwelling units above refer to the number of dwelling units using each type of fuel for space heating. The Census of Housing reports the number of dwelling units using each type of fuel in each county and in each state. The fuel category "utility gas" refers to natural gas, and the category "bottled, tank, or LP gas" is for LPG.

5.5.4.1.2 Commercial and institutional fuel use - State fuel totals for this source category can best be apportioned to counties according to population, as given in the 1970 Census of Population.[2]

$$\text{County fuel total} = \text{State fuel total} \times \frac{\text{County population}}{\text{State population}}$$

5.5.4.1.3 Industrial fuel use - County industrial fuel totals are proportional to the total number of manufacturing employees per county, as given in the 1967 Census of Manufacturers, "Area Statistics."[8]

$$\text{County industrial fuel total} = \text{State industrial fuel total} \times \frac{\text{County manufacturing employees}}{\text{State manufacturing employees}}$$

5.5.4.2 Source Category Apportioning Techniques - It is often necessary to apportion state or county fuel totals to residential, commercial-institutional, and industrial source categories. The prescribed methods for distributing each fuel total to source categories are presented below.

5.5.4.2.1 Anthracite coal - State totals for major anthracite-consuming states should be obtained from Minerals Yearbook[3] or Distribution of Pennsylvania Anthracite.[9] Anthracite may be used by all three source categories. The stepwise procedure for determining the use by each source category is presented below.

Step 1: Determine the total area source consumption of anthracite by subtracting the amount used by point sources from the state total given by the Bureau of Mines.

Step 2: Determine the residential consumption of anthracite (columns 50 through 53, card 1) according to the following method.[10] The residential anthracite consumption is a product of four factors:

1. The number of dwelling units using coal as heating fuel.
2. The coal heating requirement factor.
3. The average annual heating degree-days.
4. The correction factor for the number of rooms per dwelling unit in the study area.

The number of dwelling units heating with coal should be obtained from the 1970 Census of Housing.[7] The heating requirement factor for coal is 0.0012 ton coal per dwelling unit per degree-days. The average annual heating degree-days should be obtained from Local Climatological Data.[11] For a state, an average degree-day value compiled from all the reporting stations in the state for the year of interest should be used. For a county, the degree-day value given by the nearest reporting station should be used. For states in which there is not a large variation in degree-days among different sections of the state, it is acceptable to use one average degree-day total for the entire state in order to compute the coal use in each county. The correction factor is the average number of rooms per dwelling unit, as given in the Census of Housing,[7] divided by 5--the national average for the number of rooms per dwelling unit.

A sample calculation for State X would be as follows:

Number of dwelling units heating with coal = 10,000,
State average annual heating degree-days = 5,000,
State average rooms per dwelling unit = 4.5.

The residential use of anthracite coal is calculated:

State total = (10,000 dwelling units) (0.0012 ton coal/dwelling unit-degree-day) (5,000 degree-days) $\left(\frac{4.5 \text{ rooms}}{5.0 \text{ rooms}}\right)$ = 54,000 tons coal/year.

Step 3: The commercial-institutional (columns 10 through 14, card 2) and the industrial (columns 36 through 41, card 2) area source consumption of anthracite can be determined as follows: Subtract the calculated residential consumption figure from the anthracite area source total. All of the remaining anthracite should be assigned to the commercial and institutional category if no anthracite is consumed by industrial point sources. Assign 60 percent of the remaining amount to commercial and institutional sources and 40 percent to industrial sources if anthracite is consumed by industrial point sources.[3]

5.5.4.2.2 Bituminous coal - State totals for bituminous coal should be obtained from Minerals Yearbook[3] or Coal-Bituminous and Lignite.[12]

Step 1: The amount consumed by residential users (columns 54 through 58, card 1) must be determined. In some states anthracite coal is not available.[3] For these areas all of the residential coal consumption should be considered bituminous coal, and the total consumption can be calculated according to the same procedures given for anthracite coal. For the states in which anthracite coal is available, estimates of the number of dwelling units heating with anthracite and the number heating with bituminous must be made. Local coal dealers may be able to state what percent of their customers are sold anthracite, and what percent of their customers are sold bituminous. If not, all residential coal may be assumed to be anthracite if a sufficient amount of anthracite is available in the state. If the amount calculated for residential coal use is less than the amount of anthracite coal shown for the state by the Bureau of Mines, all residential coal use may be considered to be anthracite. If the calculated amount for residential coal use is greater than the Bureau of Mines total for that state, the difference between the two figures should be considered as the amount of bituminous coal consumed by residential sources.

Step 2: If the residential bituminous coal consumption is less than the Bureau of Mines retail dealers bituminous coal figure for the state, assign the difference to the commercial and institutioanl source category (columns 15 through 19, card 2). If the residential bituminous coal consumption is not less than the retail dealers figure, assume commercial and institutional bituminous coal consumption to be negligible.

Step 3: The state total for all industrial bituminous coal consumption is assumed to be the Bureau of Mines figure for "all other."[3] The state area source total is determined by subtracting the amount of bituminous coal consumed by industrial point sources from the state total for all industrial bituminous coal consumption. Care should be taken to ensure that coal used for industrial processes, such as for feed to coke ovens, is not included in the state point source total. The county area source totals should be entered in columns 42 through 47, card 2.

5.5.4.2.3 Distillate oil - State totals for distillate oil consumption should be determined from Mineral Industry Surveys, "Sales of Fuel Oil and Kerosene."[4]

Step 1: The amount consumed by residential sources (columns 59 through 63, card 1) is estimated by using the number of dwelling units heating with fuel oil and a heating requirement factor of 0.18 gallon oil per dwelling unit per degree-day. The method has been described in detail in the section on anthracite coal.

Step 2: Commercial and institutional distillate oil consumption is the difference between residential consumption and the sum of the figures given for "distillate-type heating oils," "kerosene used for heating," and "distillate used by the military" from Tables 5, 6, and 12 of Reference 4. Any distillate oil consumed by commercial and institutional point sources should be subtracted before the area source total is entered in columns 20 through 24, card 2.

Step 3: The state industrial area source use of distillate oil is the sum of the figures given for "industrial" and "oil companies" in Tables 8 and 9 of Reference 4, minus the amount consumed by industrial point sources. Enter the area source total in columns 52 through 56, card 2.

5.5.4.2.4 Residual oil - Use the same methods and reference as given for distillate oil. Residential sources (columns 64 through 68, card 1) do not usually consume residual oil. Local oil dealers should be contacted to determine what percent of their residential customers, if any, were sold fuel oil grades 5 and 6. The commercial and institutional area source consumption (columns 25 through 29, card 2) can be determined from figures given in Tables 7 and 12 of Reference 4, and industrial consumption can be determined from residual oil data in Tables 8 and 9 of the same publication. Remember to subtract residual oil consumption by the point sources in each source category from the Bureau of Mines totals to obtain the area source totals.

5.5.4.2.5 Natural gas - Distribution of natural gas by state is given in Table 6 of Reference 5. The proper source category totals are shown. The "commercial-institutional" category is the sum of "commercial" and "other users." Subtract point source use of gas to obtain the area source totals. Enter residential consumption in columns 69 through 73, card 1, commercial-institutional in columns 30 through 33, card 2, and industrial in columns 62 through 66, card 2.

5.5.4.2.6 LPG - In areas where large quantities of LPG are used, significant air pollution emissions can result. LPG can be converted to "equivalent natural gas" on the basis of resulting emissions. Assume that 1 gallon of LPG equals 100 cubic feet of "equivalent natural gas." LPG use by state is given in Table 2 of Reference 6. The "residential and commercial" category of Table 2 can be separated into residential and commercial-institutional by assuming that the ratio of residential to commercial use of LPG is the same as the ratio of residential to commercial use of natural gas, as given in Reference 5. The "equivalent natural gas" should be added to the area source totals for residential, commercial-institutional and industrial natural gas.

5.5.4.2.7 Wood - No published data are available for wood consumption by source category. Residential use (columns 74 through 77, card 1) can be estimated by multiplying the number of dwelling units heating with wood by the heating requirement factor of 0.0017 ton of wood per dwelling unit per degree-day. Wood may also be used industrially (columns 67 through 69, card 2) by those wood-processing operations that are not included as point sources. Wood use by these sources should be estimated if all wood-processing operations have not been identified as point sources. Space has also been provided (columns 34 and 35, card 2) for commercial-institutional use of wood. No reporting techniques for consumption of wood by users in this category are available, however. Thus, a figure for commercial-institutional consumption of wood can be entered only if adequate local data from fuel dealers or other reliable sources are available.

5.5.5 Applying Fuel Consumption Apportionment Methods

It should be evident from the discussion of the two methods for determination of area source fuel consumption that neither method can be used exclusively to produce an accurate, comprehensive source inventory. The two methods must be used together, making best use of the advantages offered by each method to offset the deficiencies in the inventory that would result from use of one method alone. This section will deal with how to apply both methods to the best advantage, and the assumptions to be made when difficulties are encountered in the use of each method. A discussion is presented for each fuel.

5.5.5.1 Coal Data - In the past, Bureau of Mines data have been relied upon mainly because coal dealers have not been able to furnish sufficiently detailed information. The state totals given by the Bureau of Mines should be regarded as accurate. When these totals are apportioned to counties, they may not be as accurate as the data provided by local dealers. The chief value of data from coal dealers is usually as a check on the Bureau of Mines figures and as an indicator of local use patterns that would not be discovered by using Bureau of Mines data alone. For instance, local dealers should be able to furnish the percent of their customers that burn anthracite and the percent that burn bituminous. Their fuel sales figures may reveal that all anthracite is consumed in only a few counties in the state, rather than distributed among all the counties, as would be predicted by apportionment of Bureau of Mines figures. If coal consumption totals obtained from dealers do not agree with Bureau of Mines figures, it is best to assume that the total state consumption given by the Bureau of Mines is correct. The distribution to source categories, particularly residential and commercial-institutional, may be more accurately provided by dealers, however. If the residential and commercial-institutional area source totals provided by dealers are regarded as correct, the industrial area source total can be adjusted, if necessary, so that the state total equals the figure given by the Bureau of Mines. If fuel dealer totals are given only for groups of counties, individual county totals can be obtained by using the appropriate apportioning technique. For residential and commercial-institutional sources, county totals derived by this method should still be regarded as more accurate than the apportioned Bureau of Mines data. A judgment must be made, however, as to whether the data provided by dealers are truly accurate. If the dealer provides data that are inaccurate or incomplete, use the Bureau of Mines data.

5.5.5.2 Fuel Oil Data - Many of the remarks made for coal data also apply for fuel oil. Distribution to source categories as provided by fuel dealers may be regarded as more accurate than the apportioned Bureau of Mines data, but the state totals reported by the Bureau of Mines should be regarded as correct. One of the chief values of dealer contacts is in determining if residual oil is used residentially. If fuel oil dealers can state what portion of their residential customers are sold residual oil for heating, then a portion of the total fuel oil consumed by residential sources, as predicted by the calculation based on number of housing units, can be assigned to residual oil.

5.5.5.3 Natural Gas - Few problems should be encountered in determining natural gas use by county. If gas dealers provide records of their sales to each source category (by county), this information should be used. If the gas dealers do not provide this information in sufficient detail, the Bureau of Mines figures should be used.

5.5.5.4 Other Fuels - LPG use by county can be determined from local dealers and Bureau of Mines data. The same criteria given for natural gas data also apply for LPG. Wood use can best be determined by the calculation based on number of dwelling units using wood as heating fuel, because much of the wood consumed may not be delivered by dealers. Use of coke and process gas by area sources can be determined only from available local information.

It should also be pointed out that the general approach to be taken is to minimize duplication of work and the number of calculations necessary. Mention has been made previously of the methods that should be used to determine area source totals. Generally, it is most convenient to start with Bureau of Mines data and determine statewide area source totals for each fuel by subtracting the amounts consumed by point sources. Any apportioning to source categories that is necessary can then be done, until statewide area source fuel consumption totals for each source category are obtained. Next, local dealer information can be compared with the Bureau of Mines data by apportioning the state area source totals to the counties for which local dealer data are available. It can then be decided, according to the criteria previously discussed, which are more accurate--the local dealer data or the Bureau of Mines data. If fuel dealer data are used, required adjustments can be made in the state area source totals so that the sum of the individual county fuel use totals does not exceed the state totals determined from the Bureau of Mines data. Finally, the adjusted statewide area source totals can be apportioned to the remaining counties for which fuel dealer information was not available. It is usually most convenient to combine all the factors used to compute area source fuel totals into one constant factor. This factor can then be multiplied by the appropriate apportioning factor for each county, such as number of dwelling units. Use of a computer can also aid in performing area source calculations.

5.6 SOLID WASTE DISPOSAL (COLUMNS 10 THROUGH 42, CARD 3)

The area source solid waste category includes on-site refuse disposal activities by residential, industrial, and commercial-institutional sources. On-site incineration refers to disposal in a small incinerator. This includes backyard burners, industrial incinerators, and incinerators at food and department stores, hospitals, and schools. On-site open burning refers to unconfined burning of waste such as leaves, landscape refuse, or other rubbish. For emission inventory purposes, only solid waste that is burned is of interest. Unfortunately, very little quantitative information about on-site solid waste disposal is available.

Two methods of collecting data are available:

1. Solid waste surveys: Some areas have conducted comprehensive surveys of solid waste disposal practices. If such a survey is available, it should be used to estimate solid waste quantities. Many such surveys cover only collected waste, however, and are of limited value for determination of on-site waste disposal quantities.
2. Per-capita generation rate: Average factors shown in Table 5-1 were derived from the 1968 National Survey of Community Solid Waste Practices.[13, 14]

Table 5-1. NATIONWIDE AVERAGE SOLID WASTE DISPOSED OF BY INCINERATION AND OPEN BURNING (lb/person-day)

Source category	Factor
Industrial on-site incineration	1.6[a]
Industrial on-site open burning	0.8[a]
Residential and commercial-institutional on-site incineration	0.65
Residential and commercial-institutional on-site open burning	0.5

[a] Unit refers to pounds per urban person per day.

No apportioning of state totals is necessary if solid waste quantities are determined from a local survey or a per-capita generation rate. The area source quantities should be entered in columns 10 through 42, card 3 of the form. Method 1 should be used, if at all possible, because method 2 does not take into account local variations in solid waste disposal practices. The factors shown for method 2 represent national averages only. They may be very inaccurate predictors of solid waste quantities in local areas. Note that, when method 2 must be used, the industrial factors are based on urban population, and the residential-commercial-institutional factors are based on total population. The necessary population data must be obtained from the 1970 Census of Population.[2]

The area source form also requires that the residential and commercial-institutional categories be reported separately. If better information from solid waste surveys cannot be obtained, assume that 75 percent of the residential-commercial-institutional total was generated by residential sources.[14]

In some areas, open burning and on-site incineration are regulated and may be prohibited. If one or both of these practices is prohibited, the corresponding generation factor(s) should not be applied. Under such circumstances assume that the solid waste that would normally be allotted to on-site disposal is handled by some other method, such as land-filling, that would not result in air pollutant emissions. For such cases, a value of zero should be entered, where appropriate, on the area source form.

5.7 MOTOR VEHICLE FUEL DATA

5.7.1 Gasoline-Powered Motor Vehicles

This area source category includes all highway use of gasoline by light-duty vehicles (under 6,000 pounds gross vehicle weight) and heavy-duty vehicles (over 6,000 pounds gross vehicle weight). Light-duty vehicles include automobiles and small trucks, while heavy-duty vehicles include larger trucks and buses. Three data collection methods for estimating gasoline-powered vehicle miles of travel (VMT) are given in order of decreasing accuracy.

1. Measured vehicle miles: Emissions from motor vehicles are best estimated using measured VMT. Total VMT can be obtained from traffic surveys conducted by state highway departments or local transportation agencies. Normally the total VMT will include diesel VMT as well as gasoline VMT. If actual vehicle-mile information is unavailable from these surveys, VMT can be estimated from traffic counts or traffic flow maps. This is accomplished by multiplying the traffic volume by the length of roadway. Since vehicle emission rates vary appreciably with average speed, VMT data should be obtained by roadway type. On the basis of average speed, roadway types can be classified as: limited access (greater than 50 mph), rural roads (45 mph), suburban roads (35 mph), and urban streets (25 mph or less). Data are entered, by roadway speed, in columns 52 through 76 of NEDS area source form, card 4.
2. County gasoline sales data: Some state tax departments compute gasoline sales by county. The county gasoline sales can be converted to VMT by multiplying by 12.2 miles per gallon.[15]

3. Published gasoline sales totals by state: If neither of the above methods can be used, state sales of gasoline for highway use may be obtained from Highway Statistics.[16] Statewide sales can then be apportioned to counties.

To complete the area source form by means of the first method above, gasoline vehicle miles of travel by roadway type are obtained by county and entered on the area source form (columns 52 through 76, card 4). If it is not possible to determine vehicle miles for each of the types of roads, the vehicle miles should be broken down at least into the urban and rural components.

If the measured vehicle mile method is used, the light-duty/heavy-duty fuel consumption breakdown should be calculated. To estimate light-duty and heavy-duty gasoline consumption, obtain the light- and heavy-duty mileage breakdown from transportation study data. Subtract the heavy-duty diesel miles from the total heavy-duty miles (see section 5.7.2). Light-duty vehicle gasoline consumption is calculated by dividing the light-duty miles by 13.6 miles per gallon. Heavy-duty vehicle gasoline consumption is obtained by dividing the heavy-duty miles by 8.4 miles per gallon.[15] These values are entered in columns 43 through 54 of card 3.

If the second method is used to complete the area source form, total county gasoline VMT, computed by assuming an average of 12.2 miles per gallon, is divided into heavy-duty miles and light-duty miles. It is assumed that approximately 11 percent of the total miles in the county are heavy-duty vehicle travel. After heavy-duty and light-duty VMT are determined, they are converted to gasoline consumption by using 13.6 miles per gallon for light-duty vehicles and 8.4 miles per gallon for heavy-duty vehicles.[15] The urban-rural breakdown of vehicle miles by county is estimated by the NEDS program using the population distribution code. The population distribution code (column 77, card 3) shows the urban component of the total county population. If this value is 2, for example, assume that 20 percent of the VMT are urban and 80 percent are rural. If the population distribution code is 3, for example, assume 30 percent of the VMT are urban, etc. The light-duty and heavy-duty gasoline consumption figures are entered in columns 43 through 54, card 3 of the area source form. The rural and urban VMT are entered in columns 58 through 63 and 70 through 76, respectively, on card 4.

In the third method, gasoline consumption must be apportioned to counties. The best means for apportionment is to use county service station sales data from the 1968 Census of Business[17] according to the following formula:

$$\text{County gasoline sales} = \frac{\text{County service station sales, \$}}{\text{State service station sales, \$}} \times \text{State gasoline sales, gal}$$

If adequate data from the 1968 Census of Business[17] cannot be obtained, population data from the 1970 Census of Population[2] should be used to apportion state gasoline sales to counties. Once this is completed, method 2 above is used to determine the values for the area source form.

The first is by far the most accurate of the three methods for the determination of gasoline motor vehicle emissions. Methods 2 and 3, based on gasoline sales, are inferior to the vehicle-mile method--method 1--because they assume that all gasoline sold in the county is consumed on the roads in the county. The vehicle-mile method measures actual vehicle travel. Another problem with the gasoline sales method is that the urban-rural breakdown of VMT must be estimated. It should be emphasized that only measured vehicle miles should be entered on the area source form. Calculated vehicle miles, based on gasoline sales data, are to be used only as described in the second method for determining light-duty/heavy-duty vehicles breakdown. If no measured vehicle miles are available, columns 52 through 76 of card 4 must be left blank.

5.7.2 Diesel-Powered Motor Vehicles

This area source category includes heavy-duty trucks and buses using diesel fuel. Again, three data collection methods can be used:

1. Vehicle miles: The best method is to obtain measured vehicle miles traveled by diesel-powered vehicles. If this information is not available, diesel vehicle miles must be calculated from the county diesel fuel sales determined by method 2 or 3 below. Diesel VMT is obtained by multiplying the diesel fuel sales by 5.1 miles per gallon.[16] If method 1 was previously used for gasoline-powered vehicles, this method must also be used for diesel-powered vehicles to account for diesel VMT included in the total VMT.
2. County diesel fuel sales: If vehicle miles cannot be obtained, gallons of diesel fuel sold per county should be obtained from the appropriate state agency or oil dealers' association.
3. Published statewide sales figures: If neither of the above methods can be used, consider the figure for "on-highway use of special fuels" reported in Highway Statistics[16] to be the amount of diesel fuel sold statewide. Apportion this total to counties using the same apportionment method as for gasoline VMT.

When the vehicle-mile method for completing the area source form is used, the only quantity to be entered on the area source form is highway diesel fuel consumption. Diesel VMT needs to be computed only to account for the diesel portion of the total VMT. The county diesel fuel consumption should be coded in columns 60 through 64 of card 3.

Obtaining measured diesel vehicle miles is by far the best method. Data may be available that indicate the percent of the total VMT by diesels. As was indicated in methods 2 and 3 for gasoline-powered vehicles (Section 5.7.1), assume that diesel fuel purchased in the county is consumed in the county. This is an even more gross assumption with diesels, however, because most diesel traffic is through-traffic.

5.7.3 Off-Highway Fuel Use (Columns 55 through 59 and 65 through 67, Card 3)

Off-highway internal combustion machines use both gasoline and diesel fuel. Off-highway gasoline-powered machines consist of farm tractors, lawnmowers, snowmobiles, etc. Off-highway diesel-powered machines include farm tractors, construction equipment, emergency generator power units, compressor engines, etc. All off-highway equipment is uncontrolled from an exhaust emission standpoint. Two data collection methods can be considered:

1. Fuel consumption factors:
    a. Gasoline fuel use: Farm tractor fuel consumption can be calculated by applying an annual per-tractor fuel consumption rate (1,000 gallons/tractor-year) to the number of tractors in use. The total consumption for all other off-highway gasoline-powered equipment may be calculated by applying a factor, based on population, of 13 gallons per person.
    b. Diesel fuel use: Farm tractor diesel fuel consumption is about 1,000 gallons per tractor annually. The total consumption for construction equipment is approximately 5,000 gallons annually per non-building construction employee. All other off-highway diesel fuel consumption may be calculated by applying a factor of 7.4 gallons per capita annually.
2. Fuel totals by state: Total off-highway use of gasoline and diesel fuel by state can be obtained from publications by the Bureau of Mines[4] and the Department of Transportation.[16]

If method 1 is used, off-highway gasoline consumption by county is calculated by summing farm tractor gasoline consumption and all other gasoline consumption. Total tractors (gasoline and diesel) by county are reported in the Census of Agriculture.[18]

About 60 percent of all tractors are gasoline-powered. The total fuel use can be calculated by multiplying the number of gasoline-powered tractors in the county by 1,000 gallons per tractor-year. All other off-highway gasoline consumption is the product of 13 gallons per capita-year and the population of the county.[2] Off-highway gasoline consumption is entered in columns 55 through 59 of card 3 on the area source form.

Using method 1, the total off-highway diesel fuel consumption by county is the sum of farm tractor usage, construction equipment usage, and all other diesel-powered equipment usage. Thirty-five percent of all tractors reported in the Census of Agriculture[18] are diesel-powered. The total farm tractor population is made up of 60 percent gasoline tractors, 35 percent diesel tractors, and 5 percent LPG tractors.

The diesel fuel usage by farm tractors is the product of the number of diesel tractors in the county and 1,000 gallons per tractor-year. The number of non-building construction employees is reported in County Business Patterns.[19] Construction equipment diesel fuel use is the product of the number of non-building construction employees in the county and 5,000 gallons per employee-year. The total for all off-highway diesel fuel use is entered in columns 65 through 67 of card 3 on the area source form.

If method 2 is used, the state totals are apportioned to the county based on the ratio of the county population to the state population.[4] The resulting quantities are entered on the area source form (gasoline in columns 55 through 59; diesel in columns 65 through 67).

Method 1 is the recommended method. The published statewide non-highway fuel totals for method 2 are determined from taxes refunded to individuals using taxed fuels for off-highway purposes. Because all individuals using fuels off-highway do not apply for tax refunds, the state totals are likely to be underestimated. It is also difficult to apportion statewide off-highway fuel totals to counties in a meaningful manner. Population apportionment, for instance, results in high farm tractor fuel consumption in large urban areas. Method 1 will be expanded and improved upon as more refined data on engine fuel consumption become available. State snowmobile registrations, for example, will allow this source to be handled separately and, therefore, more accurately.

5.7.4 Railroads (Columns 68 through 72, Card 3)

This category, which is concerned with fuel consumption by railroad locomotives, also includes the fuel used to heat railroad stations and workshops. The latter fuel use will be much less than that of locomotives and is difficult to separate from the total railroad fuel use. Hence, the railroad category is considered to be the fuel consumption by locomotives, although it does include small amounts of fuel used for space heating. The primary fuel consumed by railroads is distillate oil (diesel fuel), but smaller amounts of residual oil and coal are also used. Two data collection methods are available:

1. Contact rail lines: Rail lines may be able to furnish state totals for their fuel use, but it is unlikely that they will be able to provide information by county.
2. Bureau of Mines data: Sales of fuel oil to the railroads for use in each state are given in Table 10 of Mineral Industry Surveys.[4]

For completion of the area source form, the county fuel consumption by railroads should be entered in columns 68 through 72, card 3. State fuel totals can be apportioned to counties as follows:

1. By miles of track per county as determined from detailed state maps or obtained from the rail lines.
2. By county population as given in the 1970 Census of Population.[2]

If county fuel totals are obtained from rail lines, this information should be used. In most cases it will be necessary to apportion a state total, however. Rail line figures should be used in preference to Bureau of Mines state totals, because some preliminary apportioning may be accomplished by doing so. Fuel use by a rail line can be assigned to only that portion of the state in which the rail lines operate.

Apportionment by miles of track per county is the preferred method; however, track miles in railroad yards often cannot be determined if state maps must be used to estimate track mileage. Because operations in rail yards are usually heavier than on main-line track, emissions from yard operations may be quite significant. If yard track mileage cannot be obtained from rail lines, the yard mileage can be roughly accounted for by doubling the measured track mileage in counties where it is known that there are significant yard operations. The population apportioning technique should be used only when it is impossible to use track mileage. This technique assumes that most yard operations take place in large cities, an assumption that may or may not be true depending on the state being considered.

Residual oil, which may be used by railroads, can be accounted for if Bureau of Mines figures are used, by adding the state residual oil total for railroads to the distillate oil total before apportioning to counties. Use of coal by railroads, which can be considered negligible, does not need to be reported.

5.7.5 Vessels (Columns 24 through 40, Card 4)

This source category includes ocean-going ships, river vessels, and small pleasure craft used on lakes and rivers. A more detailed discussion of each type of vessel and the methods used to obtain fuel consumption data are presented below.

Three data collection methods are available:

1. Coal-powered vessels: There are still a few vessels, notably in the Great Lakes region, that burn anthracite coal. No reliable method for estimation of emissions on a local basis for these vessels is currently known, because only nationwide fuel totals are available.[3] Thus information on local fuel consumption can be obtained only from estimates made by port authorities or ship operators.
2. Gasoline-powered vessels: This category includes small craft operated by inboard, outboard, or inboard-outboard motors on lakes and rivers. Gasoline consumption can be estimated by using a factor of 160 gallons of gasoline per boat registration per year. This factor was derived from information on average annual operating hours, average horsepower per vessel, and average fuel consumption per horsepower-hour of operation. The estimate also approximately accounts for any non-motorized boats that may be included in the state total of registrations and for boats with small outboard motors that may not be registered.[20] State boat registration should be obtained from the appropriate state agency, such as the State Department of Recreation or Fish and Game Department, etc.
3. Fuel oil (including diesel)-powered vessels: Fuel consumption by these vessels, which are the major vessels subcategory of interest, includes the fuel used by large cargo and passenger ships, oil tankers, tugboats, and all other steamships and motorships that use fuel oil. Fuel consumption totals can be obtained by:
    a. Questionnaire surveys of shipping and tugboat companies and contact with the local port authorities. This method would provide the most accurate local data for fuel consumption rates of many of the vessels in the area. Such a survey is not often comprehensive enough to include all vessels, however, because many vessels move in and out of the port area during the year and would be difficult to contact.

    b. Use of vessel movement data supplied by the U. S. Army Corps of Engineers,[21] together with fuel consumption factors and Bureau of Mines fuel consumption figures.[4] This method is much easier to implement than a questionnaire survey, and may be almost as accurate despite the generalizations that must be made to effect its use. This method is described in detail later in this chapter.

c. Use of Bureau of Mines figures only. State totals for fuel oil sold to vessels are given in Table 11 of Reference 4. Not all the fuel sold for vessel use is by any means consumed within the state boundaries, however. Much of the fuel may be consumed far out at sea and not in a port or waterway area. If it is assumed that 75 percent of the distillate oil figure given in Reference 4 and 25 percent of the residual oil total are consumed in ports and waterways within the state, a rough estimate of vessel fuel oil consumption can be obtained. This method should not be used in conjunction with a detailed emission inventory, however, and is useful mainly to obtain an order-of-magnitude emission estimate from vessel operations.

Unique apportioning methods are used for each type of vessel when completing the area source form:

1. Coal-powered vessels: Because fuel consumption data on a local basis are very limited for coal-powered vessels, county totals may have to be obtained by apportioning state or regional totals. Anthracite coal use should be assigned to counties with major ports, according to tonnage handled in the ports. These data are available from Waterborne Commerce of the United States,[21] published by the U. S. Army Corps of Engineers for all ports, and from World Almanac[22] for major ports only. It may be that coal use is available only as a total for a multistate area. In this case it is necessary to assign fuel use to individual ports as a proportion of the total tonnage handled by all major ports included in the multistate area.
2. Gasoline-powered vessels: Gasoline use could be apportioned to counties according to boat registrations per county, but this would not be an accurate method because many boats are not used primarily in the county in which they are registered. Instead, the total gasoline consumption predicted by the state total of boat registrations should be apportioned to counties on the basis of inland water surface area. County inland water areas should be determined from the Bureau of the Census' Area Measurement Reports.[23]
3. Fuel oil-powered vessels: If fuel consumption totals are determined from a questionnaire survey, the fuel oil consumption figures should simply be assigned to the counties where the vessels are operated. If vessel movement data obtained from Reference 21 must be used, extensive apportioning measures

are necessary. The apportioning method becomes somewhat involved because both underway and dockside emissions should be considered.

Underway emissions include the emissions that occur when a vessel is moving under its own power through a waterway and when it is maneuvering into its dock space. The average fuel consumption rate during these periods for steamships (predominantly residual oil users) is 44 gallons per nautical mile, and for motorships (predominantly diesel fuel consumers) the average fuel consumption rate is 19 gallons per nautical mile.

In-port, or dockside, emissions occur when a ship operates its engines or boilers when in port to provide power for the ship's utilities. Average fuel consumption rates are 1900 gallons per day of residual oil for steamships and 660 gallons per day for motorships. The local port authority should be able to supply a figure for the number of days, on the average, that a ship remains in port. If not, an average figure of 3 days per vessel should be used.

The complete description of the vessel-movement data method for fuel oil-powered vessels is presented in stepwise form below:

Step 1: Determine in-port fuel consumption.

1. The number of vessels entering a port can be found in Section 2 of parts 1, 2, 3, and 4 of the Waterborne Commerce of the United States.[21] Each part covers a specific geographical area of the United States. Section 2 lists vessel traffic on waterways for self-propelled vessels and non-self-propelled vessels according to type and draft of vessel and direction of trip. For the first step in the determination of inport emissions, select the entries for ports in Section 2, and assume that only self-propelled vessels with a draft greater than 18 feet will be operating under their own power when in port. Determine the number of vessels meeting these conditions that enter each port, and multiply by 3 days per vessel or by a number recommended by the port authority to calculate the number of vessel-days in each port.
2. Vessel-days in port must be distributed between those ships that use residual oil and those that use distillate (diesel) oil. This procedure is illustrated as follows for State X:
    a. From Reference 4, Table 11, the amounts of distillate and residual fuel oils sold for use by vessels in each state can be found for State X.

Distillate oil consumption = 232×10^3 bbl = $9{,}750 \times 10^3$ gal

Residual oil consumption = $1{,}000 \times 10^3$ bbl = $42{,}000 \times 10^3$ gal

b. Convert fuel consumption figures to vessel-days:

$$\text{Distillate vessel-days} = \frac{9{,}750 \times 10^3 \text{ gal}}{660 \text{ gal/day}} = 14{,}800 \text{ vessel-days}$$

$$\text{Residual vessel-days} = \frac{42{,}000 \times 10^3 \text{ gal}}{1{,}900 \text{ gal/day}} = 22{,}100 \text{ vessel-days}$$

c. Then total vessel-days = 14,800 + 22,100 = 35,900

$$\text{Percent distillate vessel-days} = \frac{14{,}800}{36{,}900} \times 100\% = 40\%$$

d. Then at each port in State X, assign 40 percent of the total vessel-days to motorships (diesel fuel users) and 60 percent to steamships (residual fuel users).

3. Finally, in-port fuel consumption can be calculated by multiplying the total distillate oil vessel-days by 660 gallons per day, and the total residual oil vessel-days by 1900 gallons per day.

Step 2: Determine fuel consumption for vessels underway:

1. Underway emissions will be calculated for diesel fuel use only. In a typical harbor there are tugboats and small craft (draft less than 18 feet) that use diesel fuel. Because most of these do not operate their boilers or engines when in port, most of the emissions occur when the ships are underway. Vessels using residual oil also have underway emissions, which are approximately accounted for when emissions for vessels using diesel fuel are calculated by the technique described below.

2. Calculation of underway fuel consumption:

   a. Subtract the sum for all ports of the in-port diesel fuel consumption from the state total for distillate oil consumption by vessel as given in Reference 4, Table 11.

   b. Distribute the remaining fuel consumption figures to ports and waterways according to tonnage handled, as given in Section 1 of Waterborne Commerce of the United States.[21] Underway fuel consumption totals are assigned to counties using the description of the waterway given in Waterborne Commerce of the United States. In cases where a waterway borders more than one political jurisdiction, divide the emissions equally between jurisdictions. In instances where a waterway, such as a river, passes by a series of counties, assign the emissions to counties according to shoreline mileage along the waterway.

Essentially there is only one suitable method for determining fuel consumption by coal- and gasoline-powered vessels. The method given for each of these types of vessels at present cannot be supplemented by other techniques. If it is possible to determine coal use by vessels according to the method given, the county totals should be entered on the form in columns 24 through 27 of card 4. Likewise, the gasoline consumption total determined by the methods given previously should be entered in columns 37 through 40 of card 4.

Two methods are given that can be used for a detailed survey of fuel oil use by vessels. As mentioned previously, Bureau of Mines data alone are useful only for a rough guess of vessel fuel oil use. Little can usually be gained by using both of the methods for fuel oil consumption by vessels. Vessel-movement data serve as replacements for questionnaires or vice versa. A modified version of the vessel-movement data method would be to contact port authorities for the vessel-movement data. The Waterborne Commerce of the United States[21] data are much more complete, however, and should be used if at all possible. All four parts of Waterborne Commerce of the United States are not necessary for completion of a vessel fuel use inventory. Only that part that covers the geographic area being considered need be used. The choice of either of the first two methods depends on whether sufficiently complete data could be obtained by a questionnaire survey to justify the time required to institute the survey. If detailed data for individual types of vessels such as tugboats, tankers, and cargo ships are desired, questionnaires should be used. If only a reliable estimate of the total fuel consumption by vessel is desired, vessel-movement data are adequate. In any case, the total fuel oil consumption, both residual and distillate oil, should be entered in columns 28 through 36 of card 4. The figures entered on the form should thus be the sum of dockside and underway fuel consumption totals. In the future, should emissions from vessels increase in relative importance, the area source form may be expanded to allow space for both underway and dockside fuel consumption.

5.7.6 Aircraft (Columns 10 through 23, Card 4)

All aircraft operations are considered area sources. The required data are the number of landing-takeoff (LTO) cycles performed annually by military, civil (general aviation), and commercial aircraft. Only two data collection methods are available:

1. FAA published data: Three Federal Aviation Administration publications can be used to determine LTO cycles performed in each county.

   a. FAA Air Traffic Activity:[24] This publication gives the number of operations performed by commercial, civil, and military aircraft at airports with FAA-regulated control towers. These airports will include all the major non-military airfields in the United States. An "operation," as defined by the FAA, is either a takeoff or a landing; thus to determine the number of LTO's, the number of "operations" should be divided by two. Totals are given both for itinerant flights, those that terminate at an airport different from the one at which they originated, and for local flights, those that originate and terminate at the same airport. To determine total LTO's for each aircraft category, the sum of itinerant and local operations should be used.

   b. Military Air Traffic Activity Report:[25] This publication gives the number of operations by military and civil aircraft performed at military airfields. Follow the same procedure as given for FAA Air Traffic Activity[24] to determine LTO's.

   c. Census of U. S. Civil Aircraft:[26] This publication can be used to obtain rough estimates of the number of LTO's performed by civil aircraft at airports that do not have FAA-regulated control towers. These airports include the smaller public airports and privately owned airstrips. The Census of U. S. Civil Aircraft[26] gives the number of active civil aircraft in each county. These data can be used to estimate LTO's by assuming that the total number of eligible aircraft in each county is approximately equal to the number of daily LTO cycles performed by civil aircraft. This method should be used to estimate LTO's only for airfields not included in FAA Air Traffic Activity.[24]

2. Local contacts: The airport owners or operators can be contacted to determine the number of LTO's performed by civil aircraft at airports that do not have FAA-regulated control towers. Airport authorities can also furnish the number of LTO's for any commercial aircraft that land at the airport.

In completing the form, the number of LTO's for civil, commercial, and military aircraft at each airport should be assigned to the proper county, and the totals should be entered in columns 10 through 23, card 4.

Emissions for each aircraft category will be calculated by using average emission factors based on the mix of engine and aircraft types for each category of the U. S. aircraft fleet. As the aircraft mix within each aircraft category changes with time, and as newer information becomes available on the emission rates for each type of aircraft engine, the emission factors will be adjusted to reflect these changes.

LTO cycles at airports with FAA-regulated control towers and at military airfields can be easily determined from the FAA publications cited for method 1. LTO cycles at small airports that do not have FAA-regulated control towers can most accurately be determined by contacting airport officials. Data from the Census of U. S. Civil Aircraft[26] should be used only when adequate information cannot be determined by local contacts. In many areas the majority of civil aircraft operations are performed at airports that do not have FAA-regulated control towers; thus definitely necessary to consider the aircraft operations at these smaller ai

5.8 EVAPORATIVE LOSSES (COLUMNS 41 THROUGH 51, CARD 4)

This source category covers evaporative losses of hydrocarbons and other organic compounds at locations not considered as point sources. There are three main subcategories:

5.8.1 Gasoline-Handling Losses

Gasoline-handling losses include evaporative losses from gasoline marketing operations, i.e., filling losses from loading underground storage tanks at service stations, and spillage and filling losses from filling automobile gas tanks. Gasoline evaporative losses at refineries and bulk terminals should be considered as point sources.

5.8.2 Dry Cleaning Losses

Clothing and other textiles may be cleaned by treatment with organic solvents. The primary source of evaporation losses in the dry cleaning operation is the tumbler through which hot air is circulated to dry the clothes.

5.8.3 Surface-Coating and Miscellaneous Solvent-Use Operations

Included in this category are organic solvent losses from surface-coating, printing, metal-cleaning, and degreasing operations. Surface-coating operations involve primarily the application of paint, varnish, lacquer, or paint primer for decorative or protective purposes. The principal types of industries engaged in surface-coating operations are automobile-assembly factories, aircraft companies, container manufacturers, furniture manufacturers, appliance manufacturers, job enamelers, automobile repainters, and plastic-products manufacturers. In many industries, metal-fabricated products must be cleaned or degreased by washing with an organic solvent before final surface finishing can be completed.

Three data collection methods can be used:

1. Gasoline-handling losses can be calculated if the gasoline sales total for each county is known. If this total has not already been determined for motor vehicle emission estimates (columns 43 through 59, card 3), it should be calculated according to the methods given for on-highway motor vehicles and for off-highway gasoline use.
2. Evaporative losses for solvent-use operations can best be determined by a questionnaire survey of all suspected solvent users. Information required is the amount of solvent purchased per year in tons. If figures are available only in gallons, the average density (pound per gallon) of the solvents used should also be obtained and converted to tons.
3. An alternate method, which is not as accurate as a survey but much easier to employ, is to assume that solvent use is proportional to population. For dry cleaning operations, use of either of two factors, 2 pounds of solvent evaporated per person per year for moderate climates and 2.7 pounds per person per year for colder climates, will provide reasonable estimates. Emissions from surface-coating and degreasing operations are more difficult to estimate, however. A figure of 30 pounds per person per year has been proposed, but this estimate was derived from data obtained only in large cities, where higher-than-average concentrations of industries involved in surface-coating operations would be located, and represents the total amount of solvent used by point and area sources. Thus, the graduated scale shown in Table 5-2, based on county population obtained from the 1970 Census of Population,[2] is recommended for estimation of other solvent-use evaporative losses.

Table 5-2. SOLVENT-USE ESTIMATES

County population	Solvent used, lb/capita-year
Less than 100,000	3
100,000 - 500,000	8
500,000 - 1,000,000	18
More than 1,000,000	28

In completing the form, the total county gasoline sales (the sum of both on-highway and off-highway fuel consumption) should be entered in columns 47 through 51 of card 4. The total solvent use (the sum of the totals for dry cleaning, surface-coating, and degreasing operations, and any miscellaneous solvent use) should be entered in columns 41 through 46 of card 4. The amount of solvent purchased per year is assumed to be the amount evaporated. If further information becomes available to indicate that this is not the case, any changes can be accounted for by adjusting the solvent evaporation emission factor contained in the emission factor file. If actual data concerning solvent use can be obtained, this information should be recorded on the area source form. Otherwise the per-capita solvent-use factor should be employed. If an average density of the solvent used is not supplied, an estimate of 6.7 pounds per gallon should be used to estimate the tons of solvent purchased.[27, 28]

5.9 MISCELLANEOUS SOURCES

Each of the source categories contained in this section can produce large quantities of air pollutant emissions. The techniques for collection of the required data and estimation of emissions are normally not as refined as the methods for other area sources, however. Each type of source included in this section is discussed individually, and the best available means for making emission estimates are presented. The miscellaneous sources are characterized by intermittent emissions, rather than more or less continuous emissions that are characteristic of the other source categories. This means that even though the total emissions contributed by these sources may be relatively small, on particular days their contributions to the total emissions can be quite significant.

1. Forest fires (columns 32 through 41, card 5): Emissions from forest fires can be very significant. Estimates of the quantity and type of growth burned should be available from the U. S. Forest Service, state forestry or agriculture departments, or local fire protection agencies. In addition, the U. S. Forest Service annually publishes Wildfire Statistics,[29] which gives the total acreage burned for each state; however, this document does not provide data on acreage burned by counties. For this reason, it is much better to consult with local officials for estimates of acreage burned. If it is not possible to obtain sufficient information from local officials, the state total from *Wildfire Statistics* should be apportioned to counties according to forest acreage per county. If this information is not available from the appropriate state or local agency, the total acreage burned can be divided equally between counties with significant forest acreage, as shown on state maps.

   The determination of tons of growth burned per acre is equally important. Local officials should be contacted for this information. If they cannot provide an estimate, the factor from Table 5-3 that best describes the growth burned should be selected.

Table 5-3. FOREST FIRE ESTIMATES

Growth	Quantity burned, tons/acre
Heavily forested	40
Thinly forested or brushy	20

2. Slash burning (columns 42 through 50, card 5): Waste from logging operations is often burned under controlled conditions both to reduce the potential fire hazard in forests and to remove brush that can serve as a host for destructive insects. Because of the magnitude of this operation in certain areas, if certain meteorological conditions exist when slash burning takes place, a serious air pollution problem can result. Officials of the U. S. Forest Service or state forestry department should be contacted to provide estimates of the area burned and quantity of slash per acre. If an estimate of the quantity of slash burned per acre cannot be obtained from other sources, use the factor of 75 tons per acre.

   Also included under this source category are agricultural field-burning operations such as stubble burning and burning of refuse from land clearing. Because no published information is known to be available on this subject, information must be determined through estimates made by state agriculture departments or extension services. Estimates of acreage and tons per acre burned should be obtained. For grass burning, if a local estimate is not available, a factor of 2.5 tons per acre should be assumed. If agricultural field burning is included with slash burning on the area source form, the quantity-per-acre figure should represent a weighted average for slash burning and agricultural field burning.

3. Frost control (columns 51 through 57, card 5): In some areas orchard heaters may be used on the coldest nights of the year. The county or state department of agriculture will usually have a breakdown of the number and types of orchard heaters that are in use. Data can also be obtained from some of the citrus grove operators in the area. These sources should also be able to furnish the number of nights the units were fired during the year and the approximate length of time each night the units were burning. An estimate should also be obtained of the number of units fired at any one time.

   On the area source form should be entered the approximate number of units that are fired on each night when frost control is required, and the number of days out of the year when such operations take place. If individual county totals are not available, state or area totals should be distributed to counties according to the approximate acreage in each county subject to orchard heating.

4. Structural fires (columns 58 through 61, card 5): Building fires can also produce short-term emissions of air contaminants. The best procedure for determining information for this source category is to contact local fire departments, fire protection associations, or other agencies for an estimate of the number of structural fires that occur in each county during the year. In the absence of such information, it can be assumed that, based on the nationwide figures given by the National Fire Protection Association, an average of four fires per 1,000 population occur each year.

5. Coal refuse piles (columns 62 through 70, card 5): Burning coal refuse piles exist in some areas. The coal refuse piles, which were produced as a result of coal mining operations, were formed from coal refuse and rejected material containing too high a percentage of impurities to be marketed. Over the years, the coal refuse piles may have been ignited by spontaneous combustion or through careless or intentional acts of humans. Bureau of Mines Information Circular 8515[30] gives the location of all known burning coal refuse piles in 1968. This publication also gives the size of each bank in thousands of cubic yards and surface covered in acres. If possible, local officials and owners of the coal piles should be contacted to determine if there has been any change in status of the coal fires since 1968, and to determine if any new fires have started. This updated information can be used in conjunction with the data from the Bureau of Mines publication to estimate the extent of coal refuse fires. The total size, in hundreds of cubic yards, of all burning coal refuse piles in a county should be entered in columns 62 through 67 of card 5, and the total number of burning fires in the county should be entered in columns 68 through 70.

6. Dust emissions (columns 10 through 31, card 5): Dust emissions can result from a variety of operations. Many of the dust emissions are caused by man, but a large portion can be the result of natural events. The principal causes of dust emissions are discussed below.

   a. Vehicle travel on dirt roads (columns 10 through 16, card 5): The information that should be obtained is an estimate of the number of vehicle miles of travel on dirt roads. The state highway department may have made such estimates; if not, it should at least be able to furnish the total mileage of dirt roads in each county. This information can be converted to vehicle miles by estimating the traffic on dirt roads. County road departments can also be consulted to determine miles of dirt roads in each county. The estimate of the traffic on dirt roads should be based on information that can be gained from state or county officials.

b. Aircraft LTO's on dirt airstrips (columns 17 through 21, card 5): At certain small airports, flight cycles may be performed on dirt airstrips. At such locations an estimate of the number of annual LTO cycles performed should be calculated, or obtained from the airport operator. This entry is made to account for dust emissions only. The emissions from the combustion of fuel by the aircraft themselves will be accounted for by the aircraft LTO cycles entered in columns 10 through 23 of card 4.

c. Windblown dust and construction activities (columns 22 through 25, card 5): In some areas large dust emissions are generated as a result of windblown soil. Officials of the appropriate state agency, such as the state department of natural resources or department of agriculture, may be able to furnish estimates of the number of acres in each county that is subject to severe soil erosion. In addition, officials of the local offices of the U. S. Soil Conservation Service should be able to provide the same information. Because such estimates are usually vague, reporting the total acreage to nearest 1,000 acres is sufficient.

   Also, substantial areas may be subject to construction activities that can produce dust emissions. Road construction and large building projects, such as urban redevelopment activities and large housing subdivisions, are the chief locations where significant dust emissions are produced. An estimate of the area subject to such activities can be based on information obtained from the state highway department and local public works departments or similar agencies responsible for regulation of building construction activities. The total area subject to construction activities (to the nearest 1,000 acres) should be included in the total for columns 22 through 26 of card 5.

d. Rock handling and storage (columns 27 through 31, card 5): Usually all rock quarries and other large rock-handling operations will be included as point sources. The area source rock-handling operations would cover any smaller-scale activities, such as small sand and gravel yards, stone products manufacturers, and other mineral products industries that would not be included as point sources. The tons processed by all these small operations should be entered in columns 27 through 31 of card 5. The totals should be determined by adding the totals given on questionnaires for sources that did not qualify as point sources.

5.10 REFERENCES

1. SAROAD Station Coding Manual for Aerometric Sampling Networks. U.S. Environmental Protection Agency, Office of Air Programs. OAP Publication No. APTD-0907. Research Triangle Park, North Carolina. February 1972.
2. 1970 Census of Population, "Number of Inhabitants." PC-A series. U.S. Department of Commerce, Bureau of Census. Washington, D.C. 1970.
3. Minerals Yearbook. U.S. Department of the Interior, Bureau of Mines. Washington, D.C. 1970.
4. Mineral Industry Surveys, "Sales of Fuel Oil and Kerosene." U.S. Department of the Interior, Bureau of Mines. Washington, D.C. 1970.
5. Mineral Industry Surveys, "Natural Gas Production and Consumption." U.S. Department of the Interior, Bureau of Mines. Washington, D.C. 1970.
6. Mineral Industry Surveys, "Sales of LPG and Ethane." U.S. Department of the Interior, Bureau of Mines. Washington, D.C. 1970.
7. 1970 Census of Housing, "Detailed Housing Characteristics." HC-B series. U.S. Department of Commerce, Bureau of the Census. Washington, D.C. 1970.
8. 1967 Census of Manufacturers, "Area Statistics." MC(3) series. U.S. Department of Commerce, Bureau of the Census. Washington, D.C. 1967.
9. Distribution of Pennsylvania Anthracite (reprint from Minerals Yearbook). U.S. Department of the Interior, Bureau of Mines. Washington, D.C. 1970.
10. Ozolins, G. and R. Smith. A Rapid Survey Technique for Estimating Community Air Pollution Emissions. U.S. Department of Health, Education and Welfare, PHS, Division of Air Pollution. Publication No. 999-AP-29. Cincinnati, Ohio. October 1966.
11. Local Climatological Data, Annual Summary with Comparative Data. U.S. Department of Commerce, Environmental Sciences Service Administration. Washington, D.C. 1970.
12. Coal-Bituminous and Lignite (reprint from Minerals Yearbook). U.S. Department of the Interior, Bureau of Mines. Washington, D.C. 1970.
13. 1968 National Survey of Commmnity Solid Waste Practices. Interim report. U.S. Department of Health, Education and Welfare, PHS. Cincinnati, Ohio. 1968.
14. 1968 National Survey of Community Solid Waste Practices. Preliminary data analysis. U.S. Department of Health, Education and Welfare, PHS. Cincinnati, Ohio. 1968.
15. Automobile Facts and Figures. Automobile Manufacturers Association. Detroit, Michigan. 1971.
16. Highway Statistics. U.S. Department of Transportation, Federal Highway Administration. Washington, D.C. 1970.
17. 1968 Census of Business, Retail Trade. U.S. Department of Commerce, Bureau of the Census. BC-RA series. Washington, D.C. 1968.

18. Census of Agriculture, County Data. U.S. Department of Commerce, Bureau of the Census. Washington, D.C. 1969.

19. County Business Patterns. U.S. Department of Commerce, Bureau of the Census. Washington, D.C. 1970.

20. Statistical Abstract of the United States. U.S. Department of Commerce, Bureau of the Census. Washington, D.C 1971.

21. Waterborne Commerce of the United States. U.S. Department of the Army, Corps of Engineers. New Orleans, Louisiana. 1970.

22. World Almanac. New York, New York. 1972.

23. Area Measurement Reports. GE-20 series. U.S. Department of Commerce, Bureau of the Census. Washington, D.C. 1970.

24. FAA Air Traffic Activity. U.S. Department of Transportation. Federal Aviation Administration. Washington, D.C. 1970.

25. Military Air Traffic Activity Report. U.S. Department of Transportation, Federal Aviation Administration. Washington, D.C. 1970.

26. Census of U.S. Civil Aircraft. U.S. Department of Transportation, Federal Aviation Administration. Washington, D.C. 1970.

27. Air Pollution Engineering Manual. U.S. Department of Health, Education and Welfare, PHS. Publication No. 999-AP-40. Cincinnati, Ohio. 1967.

28. Handbook of Chemistry and Physics. Chemical Rubber Company. Cleveland, Ohio. 1971.

29. Wildfire Statistics. U.S. Department of Agriculture, Forest Service, Division of Cooperative Forest Fire Control. Washington, D.C. 1971.

30. Bureau of Mines Information Circular 8515, "Coal Refuse Fires - An Environmental Hazard." U.S. Department of the Interior, Bureau of Mines. Washington, D.C. 1971.

6. TRACE-MATERIAL AND HAZARDOUS-POLLUTANT SOURCE CODING

6.1 DESCRIPTION OF TRACE-MATERIAL AND HAZARDOUS-POLLUTANT FILE

When substantial quantities of trace materials or hazardous pollutants are discharged from a point source, the necessary information must be included in the point source file. Normally, trace-material emission factors for processes will be incorporated automatically in the Source Classification Code File for sources discharging nominal amounts of trace materials. Many sources of concern emit only trace materials, however, and must therefore be described in greater detail (e.g., beryllium manufacturers and users). Special source inventories are now being conducted to identify prime emitters of asbestos, lead, mercury, and beryllium throughout the nation. Additional point source coding forms must be completed for each of these sources to supplement cards 1 through 6 on the original point source coding form. The supplemental forms are variable data A001 and A002 cards, which describe those portions of a source's operation that relate solely to trace-material emissions. (It must be emphasized that cards 1 through 6 of the point source coding form are also to be completed for each emission source of trace materials.)

The variable data cards serve as storage for a large subsystem of data that provides approximately 26,000 cards for recording data for each point source. The first two cards in this subsystem, A001 and A002, have been allocated to trace-material and hazardous-pollutant data storage. A sample variable data coding form is shown in Figure 6-1.

6.2 INSTRUCTIONS FOR COMPLETING TRACE-MATERIALS CODING FORM

Procedures for completing cards 1 through 6 of the point source form have been specified in Chapter 4, Point Source Coding. This section discusses additional instructions for completing cards 1 through 6 if the source emits quantities of trace materials or hazardous pollutants.

In most situations, the source will emit quantities of particulates, SO_x, NO_x, hydrocarbons, and CO along with trace materials. In such cases, complete all six cards on the original coding form in addition to cards A001 and A002 for each point source. If a trace material is the only pollutant discharged, however, then it may be found that card 3 or card 5 of the point source form, or both cards, are not applicable, in which case all columns on the card(s) should be left blank. Enter zeros in spaces on card 4 relating to emission estimates of SO_x, NO_x, hydrocarbons, and CO if the source has negligible emissions of these compounds.

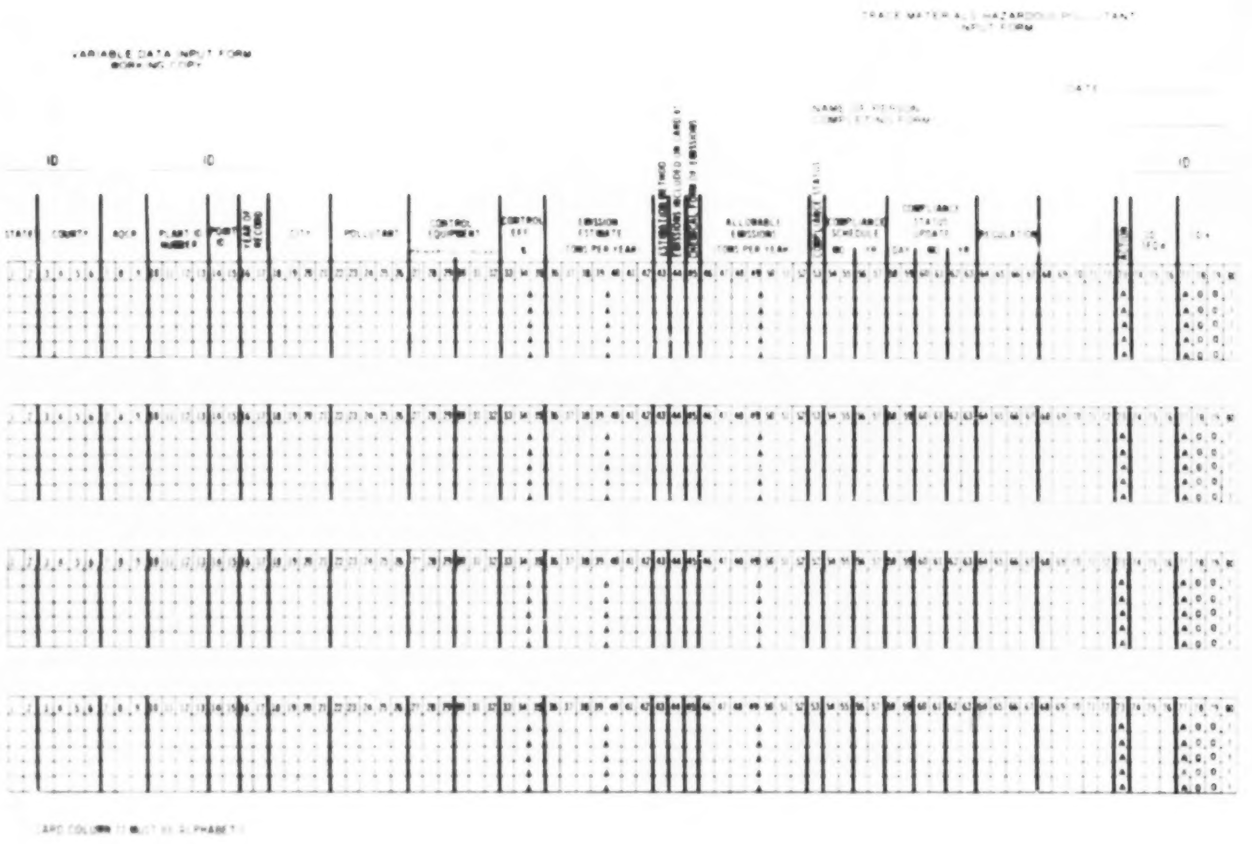

TRACE MATERIALS HAZARDOUS POLLUTANT
INPUT FORM
VARIABLE DATA INPUT FORM
WORKING COPY
DATE
NAME OF PERSON
COMPLETING FORM
ID
ID
ID
STATE
COUNTY
AQCR
PLANT ID NUMBER
POINT ID
YEAR OF RECORD
CITY
POLLUTANT
CONTROL EQUIPMENT
CONTROL EFF %
EMISSION ESTIMATE
TONS PER YEAR
ESTIMATION METHOD
EMISSIONS INCLUDED IN AREA
CHEMICAL FORM OF EMISSIONS
ALLOWABLE EMISSIONS
TONS PER YEAR
COMPLIANCE STATUS
COMPLIANCE SCHEDULE
MO YR
COMPLIANCE STATUS UPDATE
DAY MO YR
REGULATION
ACTION
CARD COLUMN 73 MUST BE ALPHABETIC

Figure 6-1. Trace materials/hazardous pollutant source coding form.

Cards A001 and A002 refer to trace-material emissions from the emission point defined on card 2 of the point source coding form. Facility and emission point identification numbers on cards A001 and A002 must be identical to those on cards 2 through 6 on the original coding form. The format for the two cards A001 and A002 is as follows:

Card A001 - Emissions of Trace Materials or Hazardous Pollutants

Spaces	Format	Symbol	Description	Units
1-13	(Same identification codes used on original point source coding form)			-
14-15	XX	Numerical	Emission Point Identification Number	-
16-17	XX	Numerical	Year of Record	-
18-21	XXXX	Numerical Code	City Code	-
22-26	XXXXX	Numerical Code	Pollutant	-
27-29	XXX	Numerical Code	Primary Control Device	-
30-32	XXX	Numerical Code	Secondary Control Device	-
33-35	XX.X	Numerical	Collection Efficiency	%
36-42	XXXX.XXX	Numerical	Emission Estimate	T/yr
43	X	Numerical Code	Method of Estimating Emissions	-
44	X	Numerical Code	Emissions Included in Emission Estimates Card 4	-
45	X	Numerical Code	Chemical Form of Emissions	-
46-52	XXXX.XXX	Numerical	Allowable Emissions	T/yr
53	X	Numerical Code	Compliance Status	-
54-57	XXXX	Numerical Code	Compliance Schedule	yr, mo
58-63	XXXXXX	Numerical Code	Compliance Status Update	yr, mo, da
64-67	XXXX	Numerical Code	Regulation Code	-
73	X	Numerical	Update	-
74-76	XXX	Numerical	Sequence Number	-
77-80	A001	Alphabetic and Numeric	Card Identification Number	-

The detailed instructions that follow are to be used to complete card A001.

1. Emission Point Identification Number: The point source identification number must correspond to that on the original coding form.

2. Year of Record: The last two digits of the calendar year that the data on the card represent are entered here.

3. City Code: The city code must be identical with that of the original coding form.

4. Pollutant: This column specifies the contaminant to which all information on each card A001 refers. A five-digit code number is assigned to all compounds known to exist in the ambient atmosphere. The codes to be used in these columns, listed in Appendix A, Section 6, are presently limited to metallic pollutants and those declared to be hazardous pollutants. This code presents a family-tree subcategorization of pollutants, an arrangement that enables retrieval of data for a single pollutant or for an entire class of pollutants. Furthermore, these codes are compatible with the SAROAD system; thus, emissions can be correlated with ambient air pollutant loadings of individual trace pollutants.

5. Primary and Secondary Control Device: Only those coding numbers specified in the Control Equipment Identification Code (Appendix A, Section 3) should be used. A code number should be entered for any installed pollution control device that reduces the emission of the pollutant into the atmosphere. Enter a zero in the columns when it is known that there is no control device installed for reducing emissions of the pollutant. Leave spaces blank when control status is unknown.

6. Collection Efficiency: The overall collection efficiency of the pollutant for the entire process should be entered here. For example, assume that the pollutant load entering the control equipment is the normal, uncontrolled quantity for that process specified in card 6 of the point source coding form. The quantity of pollutant actually discharged into the atmosphere is the outlet loading. Estimate collection efficiency with these two values. Enter a zero in the column if there is no effective removal efficiency; leave the column blank if efficiency is unknown.

7. Emission Estimate: The annual, controlled emissions of the pollutant in tons per year should be entered here. Note that the positioning of the decimal point allows emission quantities to be reported to the nearest 2 pounds of emission per year.

8. Method of Estimating Emissions: The following codes should be used to specify the manner in which the emissions reported in columns 36 through 42 were determined.

Code	Description of Method
0	Not applicable (if emissions of the pollutant are negligible)
1	Stack test results or other emission measurements
2	Material balance using engineering knowledge and process expertise
3	Emissions calculated by means of emission factors
4	Guess
5	Emissions calculated using a special emission factor that differs from the official EPA factor

9. Emissions Included in Estimates on Card 4: Emissions of the trace material specified in card A001 may already have been included in card 4 of the original coding form. For example, lead emissions might have been included in estimates of particulate losses in columns 31 through 37 of card 4. This column denotes whether or not the quantity of trace material discharged from the source was included on card 4. Use the following codings or leave blank if unknown.

Code	Description
1	All emissions of trace material were included in estimates reported on card 4
2	About one-half of the trace-material emission was probably reported on card 4
3	None of the trace-material emission was reported in the estimate reported on card 4.

10. Chemical Form of Emissions: Trace materials can be emitted as particulates, gases, or a combination of both. This column is used to estimate the chemical state of the emissions. Use the following codes and leave blank if unknown.

Code	Description
1	Emissions are primarily large settleable particulates
2	Emissions are primarily small suspended particulates
3	Emissions are primarily in the gaseous form
4	Emissions are probably a combination of particulates and gases

11. Allowable Emissions and Compliance Status: The legal requirements placed upon the source for reducing emissions of the trace material are specified in columns 46 through 63. Follow the same procedure and use the same codes as described for card 5 of the original coding form. Note that allowable emissions can be reported to the nearest 2 pounds per year.

12. Regulation Code: The instructions and coding lists for making these entries are found in Appendix A, Section 5.

13. Update, Sequence Number, and Card Identification Number: These entries are as specified on the variable data form (Figure 6-1).

Card A002 - Comments on Trace Materials or Hazardous Pollutants

Spaces	Format	Symbol	Description	Units
1-21	(Same identification as card A001)			-
22-72	Comments, alphabetic or numeric	-	-	-
73	X	Numerical	Update	-
74-76	XXX	Numerical	Sequence Number	-
77-80	A002	Alphabetic and Numeric	Card Identification Number	-

Because it is expected that there will be many unusual situations relating to the emission of trace materials at a source, columns 22 through 72 in card A002 are allowed for describing these factors. Information on this card will update knowledge of trace material emissions. This knowledge, in turn, will be used to improve the Emission Factor File and the Source Classification Code File.

7. DATA PRESENTATION

7.1 INTRODUCTION

The emission inventory system described in previous chapters has been especially designed to facilitate grouping the point and area source data in multiple arrangements. The three groupings listed below are basic "sorting" or indexing arrangements for an emission inventory:

1. Emissions according to source category (i.e., by SCC or SIC code).
2. Emissions according to pollutant (e.g., mercury emissions).
3. Emissions within a specific geographical area.

Any of these groupings can be used to display the emission data in a multitude of ways suitable for a variety of uses. For example, emissions of hydrocarbons may be automatically listed for a region, state, or county in order of relative contributions from each point source.

Another combination of groupings could involve the tabulation of emissions of all pollutants from pulp mills or chloroalkali plants in a region, state, or county. As the coding forms described in Chapters 4 and 5 are expanded by users to collect additional data for specialized uses, standard formats will be developed to summarize the data. For example, if an annual operating permit is required for each point source, then the agency may need a list revealing those permits about to expire.

Summaries and tabulations of emissions data may include:

1. Emission tabulation by source category, county, state, and region.
2. Stationary and mobile fuel balances within an area.
3. Solid waste balances.
4. Contribution of specific sources to emission totals.
5. Point source versus area source contribution.
6. Emission density maps for stationary and mobile source emissions arranged by pollutant.
7. Installed pollution control equipment.
8. Indexes of process sources emitting specific pollutants.
9. Time fluctuations of emissions.

10. Legal status of each source category to comply with air pollution control requirements.

The inventory system described in this manual is primarily intended to accumulate data on pollutant emissions; however, the corresponding process data for each source include extractable information on addresses, number of control devices, and other plant factors. For example, names and addresses of all organizations emitting asbestos (or any other pollutant) may be needed for a mailing list. In such a case the following procedure would be used:

1. Select the appropriate SCC.
2. Instruct the computer to tabulate all sources with the given SCC inside the study area.
3. Instruct the system to print out columns 22 through 63 of card 1 of the point source coding form (names and addresses) for all sources.

The inventory system is designed to determine annual emissions of pollutants; however, as the data base becomes more complete and emission factors become more accurate, the need will arise to determine variance of emission rates with time. This determination can easily be made by basing the automatic calculations of emissions on production rate data (columns 18 through 30 of card 4 of the point source coding form), thus allowing estimates of daily, weekly, and seasonal variations in emission rates to be made.

Computer programs are now being written to retrieve the inventory data according to the format described in Appendices D and E of the Federal Register dated August 14, 1971. This format summarizes county emissions by area/point sources and according to specific groupings of source categories. When completed, such summaries will be routinely produced by OAP, EPA for county, state, or regional areas. Moreover, as requests for other summaries become more frequent, additional programs will be developed by OAP.

It must be emphasized that the main advantages of a large, computerized data base are:

1. The availability of relatively small quantities of detailed information contained in the large data base (e.g., all data available on one or two power plants).
2. The ability to obtain short summaries from the large data base.

The first advantage has been partially discussed in previous paragraphs and is probably most valuable in those agency decisions that require detailed technical information; however, decisions on pollution control strategies are made on many governmental levels, each of which requires data in varying degrees of detail. Decisions at higher levels of management may require only a brief emission summary from the control agency. Unfortunately, acquiring these numbers may be time-consuming without computer access and a well-arranged data system. The inventory system described in this manual has sufficient flexibility and capability to substantially reduce manpower expenditures in answering questions such as, "What are the particulate emissions in this Congressional District and where do they come from?" Such requests can often be easily interpreted by a pictorial presentation of emissions data. For example, "pie" charts comparing the contributions of source categories to total emissions might be more easily understood by the general public than numerical tables.

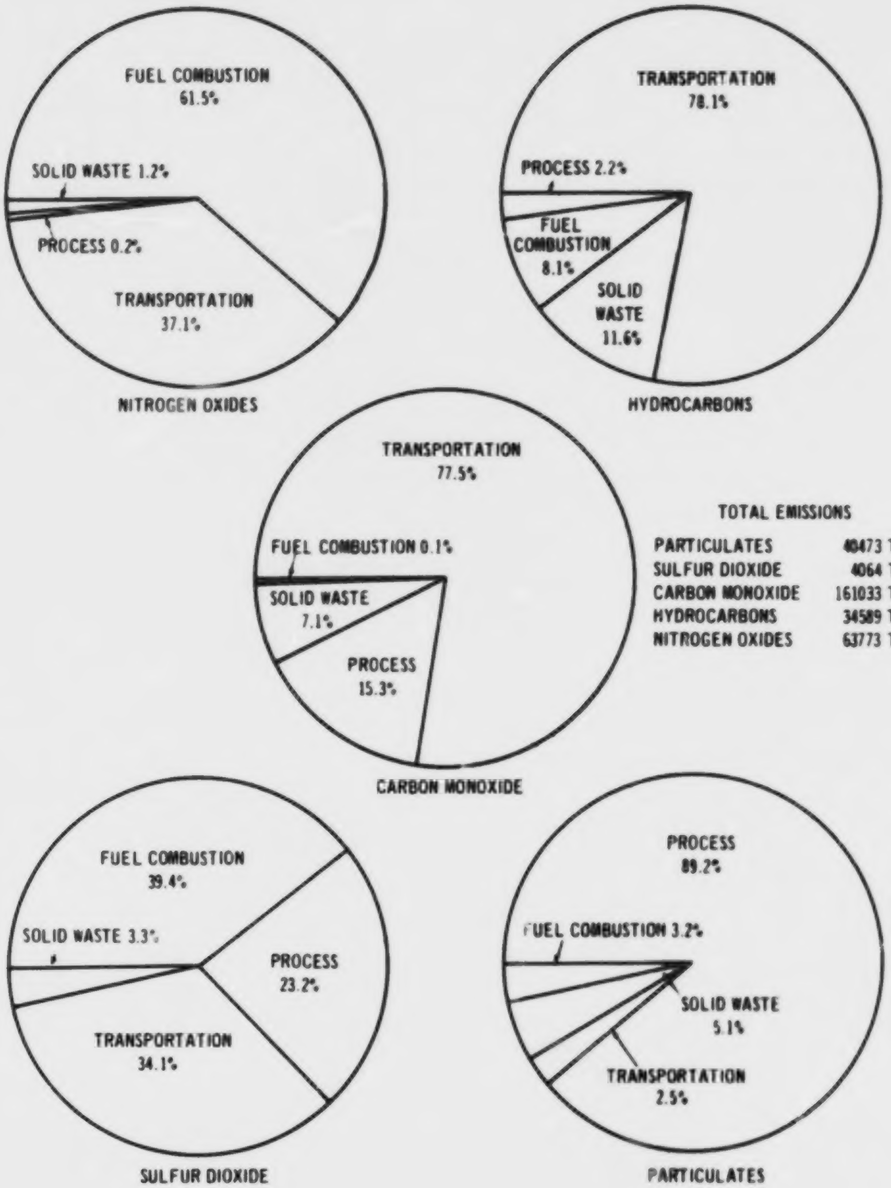
Figure 7-1 demonstrates the use of the pie chart to display concisely a large amount of information that would occupy several pages of tables in a report. Pie charts are easily constructed and can simplify comparison of data on various emissions and their sources. Because the charts compare emissions on a relative basis in percentages and fractions of total emissions, the total emissions should also be listed. With the totals and percentages, calculations of quantities of emissions are easily made. Furthermore, visual comparison of the relative quantities of emissions is possible if the total area of each chart corresponds to the quantity of each pollutant. A series of charts would then contain "pies" of different sizes according to the varying quantities of emission.

Emission density maps offer one of the best methods of revealing (1) source contributions by geographical area, and (2) concentrations of emitted pollutants by geographical area. Because the inventory techniques described in this manual allow emissions to be collected on a countywide basis, pollutant density maps can be constructed automatically with a computer plotter. Moreover, techniques for apportioning the countywide data to smaller areas, thus showing more clearly the emission density profile of each county, have been developed and are based on "gridding." The county emissions apportioned to each grid are then used to construct an emission density map for the county.

A map of the study area is divided into a grid pattern using the UTM coordinate system as shown in Figure 7-2. This grid is used as the basic unit of area in summarizing the emissions of each pollutant from all sources. The rest of this chapter explains the procedure for apportioning county emission data to grids.

7.2 APPORTIONING POPULATION DATA TO GRIDS

Information on population and housing distribution in counties by census tracts is available for 1970 from the U. S. Bureau of the Census. The following documents provide the most useful data:



TOTAL EMISSIONS	
PARTICULATES	40473 TONS
SULFUR DIOXIDE	4064 TONS
CARBON MONOXIDE	161033 TONS
HYDROCARBONS	34589 TONS
NITROGEN OXIDES	63773 TONS

Figure 7-1. Use of pie charts to illustrate relative distribution of pollutant emissions from various sources.

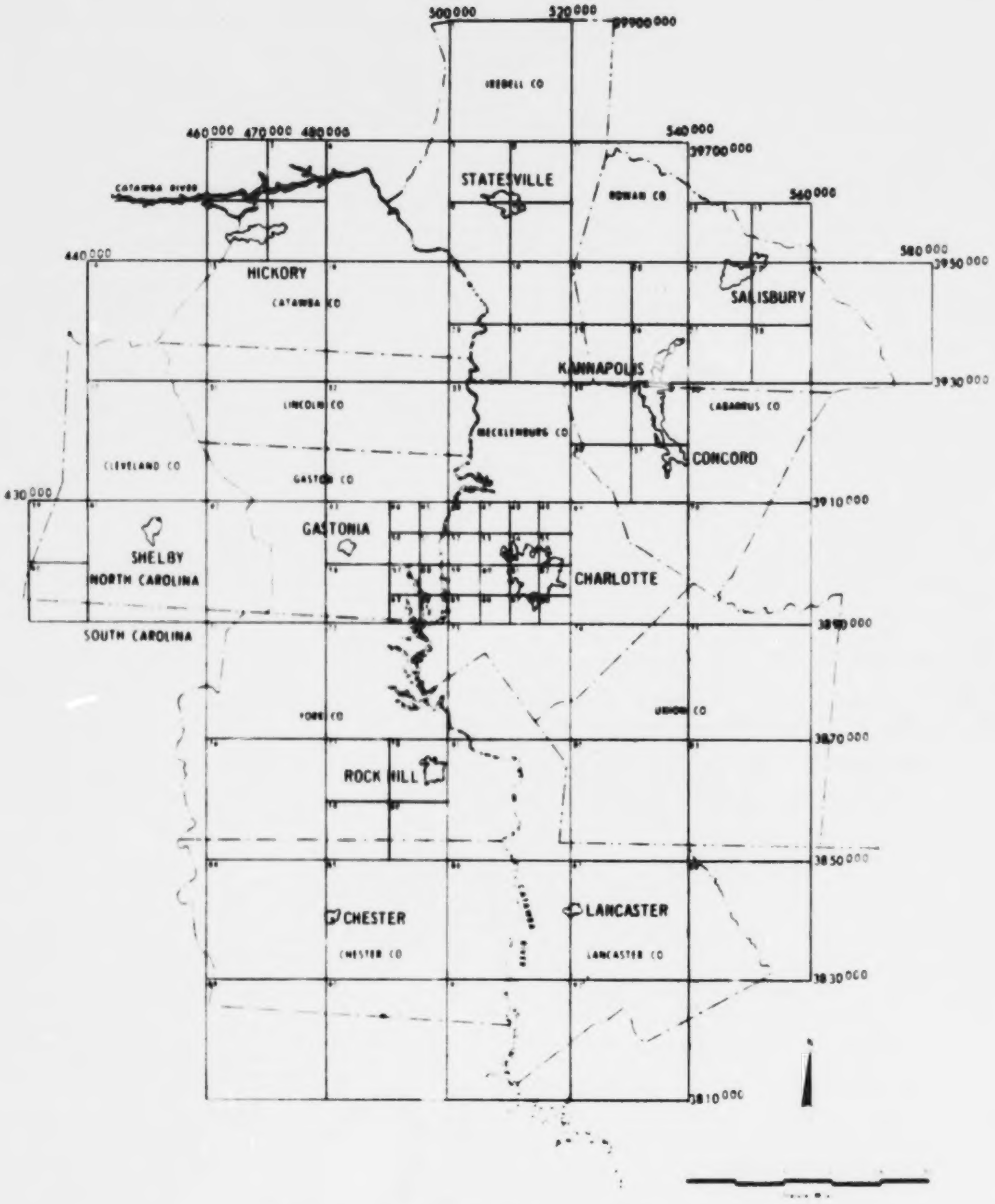

500000
520000
3990000
IREDELL CO
460000
470000
480000
540000
3970000
CATAWBA RIVER
STATESVILLE
ROWAN CO
560000
440000
580000
3950000
HICKORY
CATAWBA CO
SALISBURY
KANNAPOLIS
3930000
LINCOLN CO
MECKLENBURG CO
CABARRUS CO
CLEVELAND CO
CONCORD
GASTON CO
430000
3910000
GASTONIA
SHELBY
NORTH CAROLINA
CHARLOTTE
3890000
SOUTH CAROLINA
YORK CO
UNION CO
3870000
ROCK HILL
3850000
CHESTER
CATAWBA RIVER
LANCASTER
CHESTER CO
LANCASTER CO
3830000
3810000

Figure 7-2. Grid coordinate system example.

General Characteristics for States, Cities, and Counties.[1]

Contains statistics on number of units at each address, number of rooms, kitchen facilities, commercial establishment on property, and vacancy status for all places surveyed; data are broken down by states, counties, SMSA's, urbanized areas, and places with 1,000 inhabitants or more.

Detailed Characteristics for States, Cities, and Counties.[2]

Contains selected data on number of units at each address, number of rooms, heating equipment, fuel heating, cooking and water heating, appliances, automobiles, and data available for all or some of the following areas: states, counties, SMSA's, urbanized areas, and places with 2,500 inhabitants or more.

Census Tract Reports.[3]

Contains one report for each SMSA, showing data for most of the population and housing subjects included in the 1970 census. Some tables are based on 100 percent tabulation, others on sample tabulation.

Number of Inhabitants.[4]

Contains final official population counts for states, counties (by urban-rural residence), SMSA's, urbanized areas, minor civil divisions, county divisions, all incorporated places, and unincorporated places with 1,000 inhabitants or more.

Before obtaining any of the above documents, it is suggested that the nearest U. S. Department of Commerce field office listed below be contacted first to determine what written information is currently available for the study area. If highly detailed information is sought, the field office can offer assistance in obtaining the information from computer tape, if available. A more complete breakdown of population and housing data might be available from local planning agencies or the Chamber of Commerce.

U. S. DEPARTMENT OF COMMERCE FIELD OFFICES

Albuquerque, N. Mex. 87101, U. S. Courthouse
Anchorage, Alaska 99501, 412 Hill Building
Atlanta, Ga. 30303, 75 Forsyth St., N. W.

Baltimore, Md. 21202, U. S. Customhouse
Birmingham, Ala. 35205, 907 Sough 20th St.
Boston, Mass. 02203, John F. Kennedy Fed. Bldg.
Buffalo, N. Y. 14203, 117 Ellicott St.

Charleston, S. C. 29403, 334 Meeting St.
Charleston, W. Va. 25301, 500 Quarrier St.
Cheyenne, Wyo. 82001, 2120 Capitol Ave.

Chicago, Ill. 60604, 219 South Dearborn St.
Cincinnati, Ohio 45202, 550 Main St.
Cleveland, Ohio 44114, 666 Euclid Ave.

Dallas, Tex. 75202, 1114 Commerce St.
Denver, Colo. 80202, Room 161, New Customhouse
Des Moines, Iowa 50309, 210 Walnut St.
Detroit, Mich. 48226, Federal Bldg.

Greensboro, N. C. 27402, Federal Bldg.

Hartford, Conn. 06103, 450 Main St.
Honolulu, Hawaii 96813, 1015 Bishop St.
Houston, Tex. 77002, 515 Rusk Ave.

Jacksonville, Fla. 32202, 400 West Bay St.

Kansas City, Mo. 64106, 601 East 12th St.

Los Angeles, Calif. 90024, 11000 Wilshire Blvd.

Memphis, Tenn. 38103, 147 Jefferson Ave.
Miami, Fla. 33130, 25 West Flagler St.
Milwaukee, Wis. 53203, 238 West Wisconsin Ave.
Minneapolis, Minn. 55401, 110 South Forth St.

New Orleans, La. 70130, 610 South St.
New York, N. Y. 10007, 26 Federal Plaza, Foley Sq.

Philadelphia, Pa. 19107, 1015 Chestnut St.
Phoenix, Ariz. 85025, 230 North First Ave.
Pittsburgh, Pa. 15222, 1000 Liberty Ave.
Portland, Oreg. 97204, 520 S. W. Morrison St.

Reno, Nev. 89502, 300 Booth St.
Richmond, Va. 23240, 400 North 8th St.

St. Louis, Mo. 63103, 1520 Market St.
Salt Lake City, Utah 84111, 125 South State St.
San Francisco, Calif. 94102, 450 Golden Gate Ave.
San Juan, P. R. 00902, Post Office Bldg.
Savannah, Ga. 31402, 125-29 Bull St.
Seattle, Washington 98104, 909 First Ave.

Once the census tract map has been obtained, an overlay for the grid system, as shown for one county in Figure 7-3 can be used. Data for the more densely populated shaded portion would be given on a similar map showing only the tracts in the shaded portion. Assuming that the population and housing are distributed uniformly over each

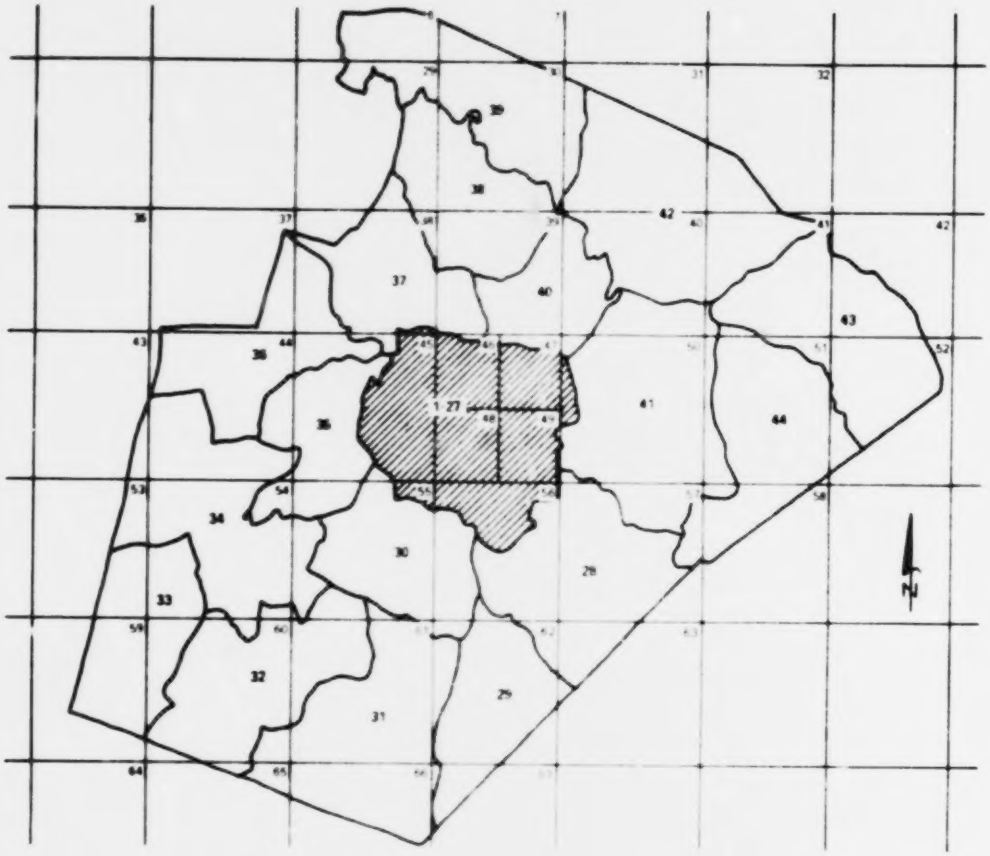

29
31
32
39
38
36
37
42
40
41
42
37
40
43
43
36
44
45
46
47
50
51
52
27
48
49
35
41
44
53
54
55
56
57
58
34
30
28
N
33
59
60
61
62
63
32
29
31
64
65
66
67

Figure 7-3 UTM grid overlay of census tract map of one county

census tract, it is now possible to estimate the population density for each grid zone. Populations for each grid zone are computed by estimating the fraction of a census tract in a grid zone, multiplying this fraction by the total population of the census tract, and summing the contributions of each census tract within the grid zone. This procedure is now being computerized by OAP, EPA. The computer program divides each fraction of a census tract into appropriate grids before multiplying the fractions by the total population of the census tract. This procedure ensures that all the population in the census tract is apportioned onto the grids. After apportioning, the populations in all grids in the study area are checked to ensure that the sum is identical to the total population of all census tracts in the study area.

Figure 7-4 shows the grid system selected for a three-county example study area. Using the procedure described above, the population density map of Figure 7-5 has been constructed for this area by dividing the population of each grid zone by the area of that grid zone. Data for housing and types of space heating are distributed in the same way as those for population.

7.3 APPORTIONING TRANSPORTATION EMISSIONS TO GRIDS

To properly assess the impact of emissions of transportation sources, the emissions must be apportioned onto the grids. Apportioning is done on the basis of vehicle miles traveled in each grid for motor vehicles, miles of railroad track in each grid for railroads, and ship traffic data for vessels. Aircraft, considered as area sources, are applied to the grids at airport locations.

7.3.1 Apportioning Vehicle Miles Traveled and Vehicle Emissions to Grids

If possible, comprehensive traffic-count maps from local and state highway departments and metropolitan planning agencies should be obtained. These maps should, as least, show traffic counts (in units of vehicles per day) for all expressways, major arterial roads of major cities, and downtown streets of major cities to ensure that a substantial portion of the commuting traffic and through traffic can be accurately proportioned. The grid zones are delineated on these maps in the same manner as was done for census tract maps. The number of vehicle miles traveled on a road in a grid zone is obtained by measuring the miles of road between two consecutive traffic counts and multiplying this distance by the numerical average of the two counts. When measuring the vehicle miles, special note should be taken of the number of vehicle miles traveled per grid on roads where diesel-powered vehicles would most likely travel: expressway, arterial, and downtown roads. These totals will be required later in the methodology.

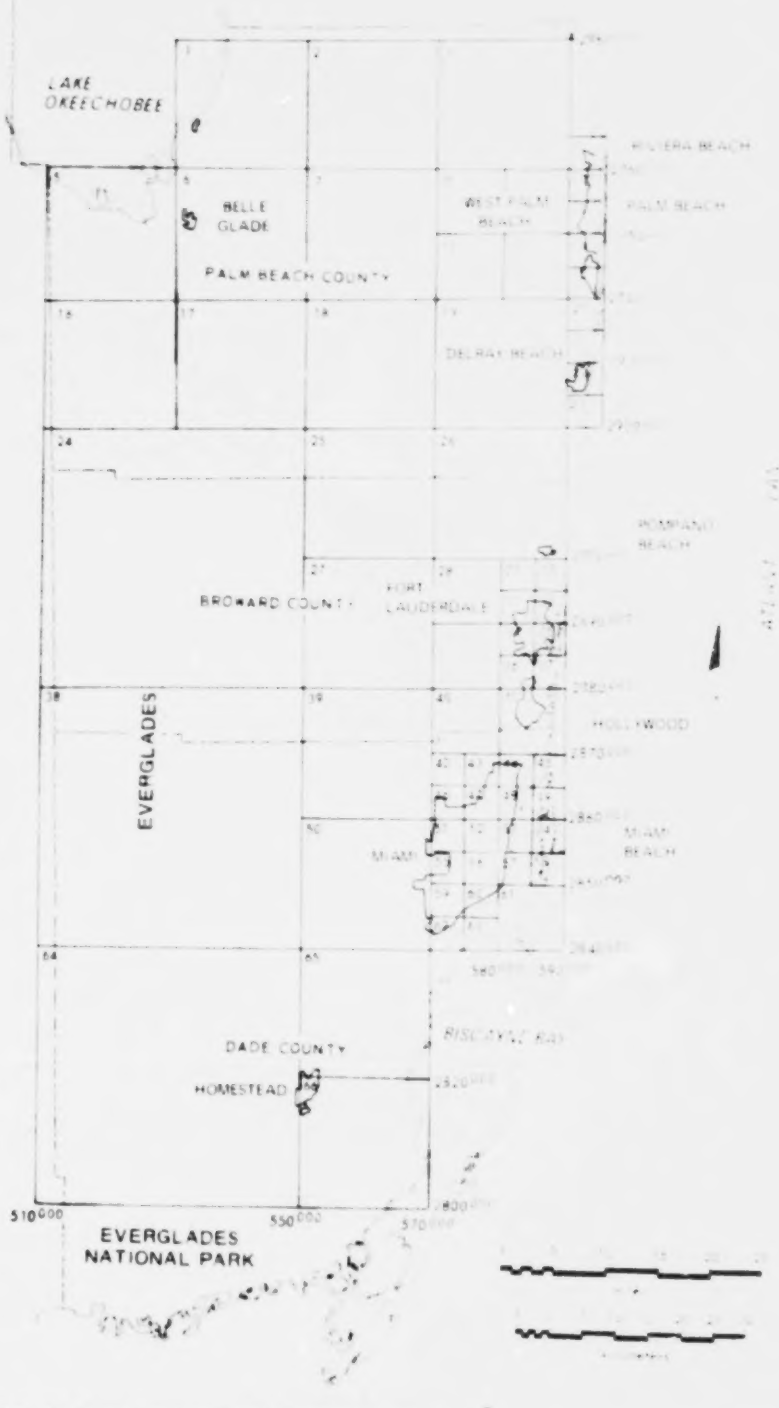

LAKE OKEECHOBEE
BELLE GLADE
PALM BEACH COUNTY
RIVIERA BEACH
WEST PALM BEACH
PALM BEACH
DELRAY BEACH
POMPANO BEACH
FORT LAUDERDALE
BROWARD COUNTY
HOLLYWOOD
EVERGLADES
MIAMI
MIAMI BEACH
BISCAYNE BAY
DADE COUNTY
HOMESTEAD
EVERGLADES NATIONAL PARK
510000
550000
570000
580000
590000
2870000
2840000
2820000
2800000

Figure 7-4. Grid coordinate system for example study area.[5]

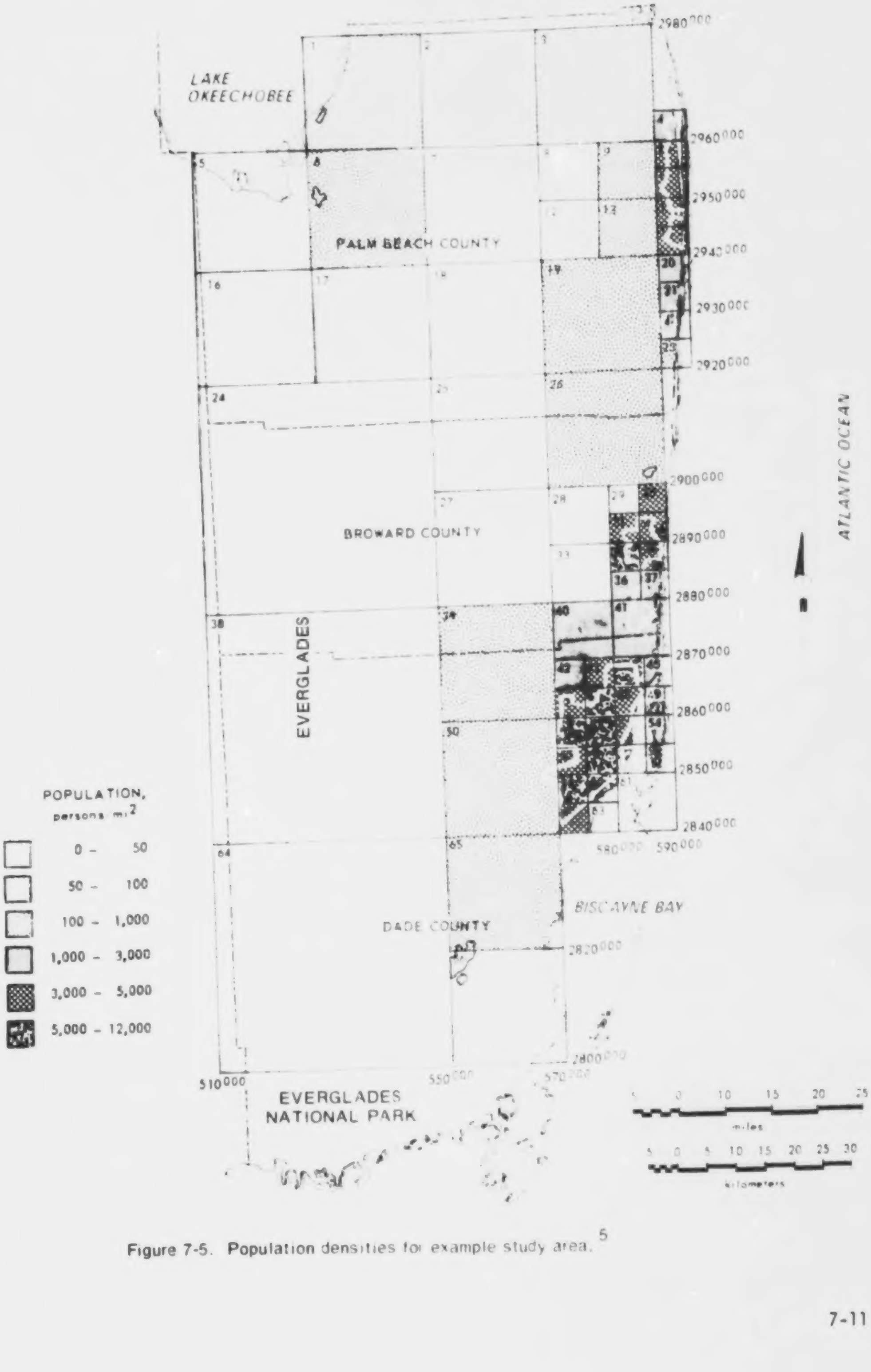

LAKE OKEECHOBEE
PALM BEACH COUNTY
BROWARD COUNTY
DADE COUNTY
EVERGLADES
EVERGLADES NATIONAL PARK
BISCAYNE BAY
ATLANTIC OCEAN
2980000
2960000
2950000
2940000
2930000
2920000
2900000
2890000
2880000
2870000
2860000
2850000
2840000
2820000
2800000
510000
550000
570000
580000
590000
POPULATION, persons mi2
0 - 50
50 - 100
100 - 1,000
1,000 - 3,000
3,000 - 5,000
5,000 - 12,000
5 0 10 15 20 25
miles
5 0 5 10 15 20 25 30
kilometers

Figure 7-5. Population densities for example study area.[5]

It is very unlikely that the traffic-count maps that are used to measure vehicle miles will be of the same year as the intended emission inventory; these maps will, therefore, require updating. This updating should reflect the total increase in gasoline-powered and diesel-powered motor vehicle activity in the study area since the traffic-count map was made. Diesel vehicle miles and gasoline vehicle miles should be updated separately by means of the fuel consumption totals for each.

Before the traffic-count totals can be updated or the diesel-powered vehicle miles proportioned, the number of diesel-powered vehicle miles included in the total vehicle miles on the traffic-count maps must be determined. The diesel-powered vehicle miles can be estimated by multiplying the percent of the total vehicle miles in the study area that are deisel-powered by the vehicle miles of each grid that were measured from roads having diesel traffic. The diesel percentages should also take the year of the traffic survey into consideration. Remaining diesel-powered vehicle miles should then be apportioned to grid zones on the basis of those diesel-powered vehicle miles already distributed by the traffic-count maps.

The last step before calculating emissions is to distribute the gasoline-powered vehicle miles that remain after the traffic-count maps have been used. These undistributed vehicle miles may be apportioned on the basis of population because most remaining motor vehicle activity would occur in residential areas.

In many cases vehicle counts will be unavailable. In such a situation, the grid zones must be laid out on a road map of the study area. The total miles of road in each grid zone are calculated on the basis of the following street classes: major, industrial, commercial, residential, and other; the average vehicle counts as given in Table 7-1 can then be applied in determining the vehicle miles for the grid zone.

Table 7-1. AVERAGE VEHICLE COUNTS BY LAND USE [6]
(vehicles/day)

Street class	Density
Major	17,000
Industrial	14,000
Commercial	10,000
Residential	1,000
Other	1,000

After the vehicle miles have been established for each zone, it will be necessary to estimate the emissions for the zones based on the vehicle miles. The following factors must be taken into account in computing the emissions: sources of pollutants within the vehicle, degree of emissions control, and average speed for each type of road in the zone.

Pollutants emanate from the exhaust system, engine crankcase blowby, carburetor, and fuel tank in an uncontrolled gasoline-powered vehicle. The exhaust system emissions consist of all the products of fuel combustion; the crankcase emissions are hydrocarbons that escape from the engine cylinders. The emissions from the carburetor and fuel tank are evaporative hydrocarbons. Before the proper emission factors can be applied, an average speed for each type of road must be assumed. These average speeds are often available from local traffic information; if not, the average speeds shown in Table 7-2 can be used.

Table 7-2. AVERAGE VEHICLE SPEEDS BY ROUTE CLASS[7]
(mi/hr)

Route class	Average speed
Urban streets	25
Suburban roads	35
Rural roads	45
Limited-access expressway	50 and greater

For each grid an estimate should be made of total vehicle miles traveled by diesel vehicles. An estimate of these miles can be made from local traffic data and subtracted from the total vehicle miles for a given grid. If such data are not available, 2 percent of the total vehicle miles for an area may be considered to be traveled by diesel vehicles. When estimating diesel vehicle miles, one should be careful not to estimate diesel miles in residential areas and on roads that are restricted to automobiles, such as roads that specify "no through trucks."

The following example illustrates how emissions from motor vehicles in one grid zone are calculated.

Example 7-1. Calculation of Motor Vehicle Emissions for a Grid Zone.

Given:

I. By planimeter measurement, the grid zone has:
   2 miles of residential roads
   1 mile of arterial roads
   1 mile of business roads

II. Vehicle counts for the roads in the grid zones are broken down in the following ways:
   Residential routes = 1,000 vehicles/day
   Arterial routes = 10,000 vehicles/day
   Business routes = 20,000 vehicles/day

III. Because no data are available on the percentage of vehicles that are diesel, it will be assumed that 2.5 percent of the vehicles on business routes are diesel-powered, and that residential and arterial routes have no diesel traffic.

IV. Emission factors[8] are given in grams per vehicle mile for gasoline-powered vehicles and in pounds per 1000 gallons of diesel fuel for diesel-powered vehicles. It will be assumed that diesel-powered vehicles get 5.1 miles per gallon of diesel fuel.

Calculations:

I. Vehicle Miles Traveled (VMT):

$$\text{Residential VMT} = \left(1{,}000\ \frac{\text{vehicles}}{\text{day}}\right)(2\ \text{miles}) = 2{,}000\ \frac{\text{VMT}}{\text{day}}$$

$$\text{Arterial VMT} = \left(10{,}000\ \frac{\text{vehicles}}{\text{day}}\right)(1\ \text{mile}) = 10{,}000\ \frac{\text{VMT}}{\text{day}}$$

$$\text{Business VMT} = \left(20{,}000\ \frac{\text{vehicles}}{\text{day}}\right)(1\ \text{mile}) = 20{,}000\ \frac{\text{VMT}}{\text{day}}$$

$$\text{Gasoline VMT} = \left(20{,}000\ \frac{\text{VMT}}{\text{day}}\right)(0.975) = 19{,}500\ \frac{\text{gasoline VMT}}{\text{day}}$$

$$\text{Diesel VMT} = \left(20{,}000\ \frac{\text{VMT}}{\text{day}}\right)(0.025) = 500\ \frac{\text{diesel VMT}}{\text{day}}$$

II. Gallons of diesel fuel:

$$\frac{\left(500\ \frac{\text{diesel VMT}}{\text{day}}\right)}{\left(5.1\ \frac{\text{miles}}{\text{gal diesel fuel}}\right)} = 100\ \text{gal diesel fuel/day}$$

III. Emissions:

A. SO_2

$$\text{Residential} = \left(2000\ \frac{\text{VMT}}{\text{day}}\right)(0.18\ \text{gal/VMT})\left(\frac{1\ \text{lb}}{454\ \text{gal}}\right) = 0.8\ \frac{\text{lb}}{\text{day}}$$

$$\text{Arterial} = \left(10{,}000\ \frac{\text{VMT}}{\text{day}}\right)(0.18\ \text{gal/VMT})\left(\frac{1\ \text{lb}}{454\ \text{gal}}\right) = 4.0\ \frac{\text{lb}}{\text{day}}$$

$$\text{Business} = \left(19{,}500\ \frac{\text{VMT}}{\text{day}}\right)(0.18\ \text{gal/VMT})\left(\frac{1\ \text{lb}}{454\ \text{gal}}\right) = 7.7\ \frac{\text{lb}}{\text{day}}$$

$$\text{Diesel} = \left(\frac{100\ \text{gal diesel fuel}}{\text{day}}\right)\left(\frac{45\ \text{lb}}{1000\ \text{gal diesel fuel}}\right) = 4.5\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total } SO_2 = 17\ \frac{\text{lb}}{\text{day}}$$

B. Particulate

$$\text{Residential} = \left(10{,}000\ \frac{\text{VMT}}{\text{day}}\right)(0.30\ \text{gal/VMT})\left(\frac{1\ \text{lb}}{454\ \text{gal}}\right) = 1.3\ \frac{\text{lb}}{\text{day}}$$

$$\text{Arterial} = \left(10{,}000\ \frac{\text{VMT}}{\text{day}}\right)(0.30\ \text{gal/VMT})\left(\frac{1\ \text{lb}}{454\ \text{gal}}\right) = 6.6\ \frac{\text{lb}}{\text{day}}$$

$$\text{Business} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (0.30\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 12.9\ \frac{\text{lb}}{\text{day}}$$

$$\text{Diesel} = (\frac{100\ \text{gal diesel fuel}}{\text{day}})\ (\frac{13\ \text{lb}}{1000\ \text{gal diesel fuel}}) = 1.3\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total Particulates} = 22.1\ \frac{\text{lb}}{\text{day}}$$

C. NO_x

$$\text{Residential} = (2{,}000\ \frac{\text{VMT}}{\text{day}})\ (9\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 40\ \frac{\text{lb}}{\text{day}}$$

$$\text{Arterial} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (9\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 198\ \frac{\text{lb}}{\text{day}}$$

$$\text{Business} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (9\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 387\ \frac{\text{lb}}{\text{day}}$$

$$\text{Diesel} = (\frac{100\ \text{gal diesel fuel}}{\text{day}})\ (\frac{370\ \text{lb}}{1000\ \text{gal diesel fuel}}) = 37\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total } NO_x = 662\ \frac{\text{lb}}{\text{day}}$$

D. CO

$$\text{Residential} = (2000\ \frac{\text{VMT}}{\text{day}})\ (95\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}})\ (1.2)^{*} = 502\ \frac{\text{lb}}{\text{day}}$$

$$\text{Arterial} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (95\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}})\ (1.0)^{*} = 2092\ \frac{\text{lb}}{\text{day}}$$

$$\text{Business} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (95\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}})\ (2.1)^{*} = 8570\ \frac{\text{lb}}{\text{day}}$$

$$\text{Diesel} = (\frac{100\ \text{gal diesel fuel}}{\text{day}})\ (\frac{225\ \text{lb}}{1000\ \text{gal diesel fuel}}) = 22\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total CO} = 11{,}186\ \frac{\text{lb}}{\text{day}}$$

E. HC

Residential

$$\text{Exhaust} = (2000\ \frac{\text{VMT}}{\text{day}})\ (12\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}})\ (1.15)^{*} = 61\ \frac{\text{lb}}{\text{day}}$$

$$\text{Crankcase} = (2000\ \frac{\text{VMT}}{\text{day}})\ (0.9\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 4\ \frac{\text{lb}}{\text{day}}$$

$$\text{Evaporative} = (2000\ \frac{\text{VMT}}{\text{day}})(2.7\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 12\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total Residential HC} = 77\ \frac{\text{lb}}{\text{day}}$$

Arterial

$$\text{Exhaust} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (12\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}})\ (1.0)^{*} = 264\ \frac{\text{lb}}{\text{day}}$$

---

* Average vehicle speed adjustment factor. Adjustments of the emission factors for CO and HC are necessary because the emissions of these pollutants vary considerably with vehicle speed.[8]

$$\text{Crankcase} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (0.9\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 20\ \frac{\text{lb}}{\text{day}}$$

$$\text{Evaporative} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (2.7\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 60\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total Arterial HC} = 344\ \frac{\text{lb}}{\text{day}}$$

Business

$$\text{Exhaust} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (12\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}})\ (1.75)^{*} = 902\ \frac{\text{lb}}{\text{day}}$$

$$\text{Crankcase} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (0.9\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 39\ \frac{\text{lb}}{\text{day}}$$

$$\text{Evaporative} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (2.7\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 116\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total Business HC} = 1{,}057\ \frac{\text{lb}}{\text{day}}$$

Diesel

$$(100\ \text{gal diesel fuel})\ (\frac{37\ \text{lb}}{1000\ \text{gal diesel fuel}}) = 3.7\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total HC} = 1{,}482\ \frac{\text{lb}}{\text{day}}$$

Whenever a large number of grid zones are involved, the above procedure should be computerized. Calculation of the vehicle miles by category in each grid remains a manual operation. The estimation of vehicle emissions based on vehicle miles traveled is very time-consuming. Data are often not available, and available data are often out of date. The calculation of emissions of those pollutants that are not affected by speed is not easy. Despite the above disadvantages, the method based on vehicle miles is the best available at present.

7.3.2 Apportioning Railroad Track and Railroad Emissions to Grids

Railroad emissions in most areas do not contribute significantly to the total emissions from mobile sources. The procedure outlined here is very general and easily carried out. If more detailed information is desired for grids containing extensive track facilities, such data can often be obtained locally by contacting the stationmaster or other railroad officials. They may be able to provide such information as the number of trains per day, number of switch engines in the yard, hourly fuel consumption rates, and number of operating days per year. In most cases the procedure outlined below is sufficient to distribute railroad emissions among the grids.

---

* Average vehicle speed adjustment factor. Adjustments of the emission factors for CO and HC are necessary because the emissions of these pollutants vary considerably with vehicle speed.[8]

If possible, fuel consumption data should be obtained from individual railroad companies that operate in the study area. In some cases, the consumption may be broken down by stations within the study area. If this is not possible, information on annual consumption of railroad diesel fuel by states is available from the Bureau of Mines.[9] The state fuel total is distrubuted into counties, based on miles of track per county. Using listed emission factors,[8] the emissions from railroad fuel use may be estimated for each county.

In order to distribute the county emissions onto a grid system, the miles of railroad tracks in each grid may be measured from USGS topographic or other appropriate maps, and the pollutants may be apportioned according to the ratio of track miles in a given grid to the summation of total track miles in the county. If a grid contains segments of more than one county, the above procedure should be followed for each county, and the combined emissions should be reported for the grid. Yard operations must be distributed separately from information on fuel consumption by switch engines.

7.3.3 Apportioning Vessel Emissions to Grids

Emissions from this source category are best estimated by obtaining from local shipping and tugboat companies the quantity of fuel consumed by their vessels while in the study area. Because many companies might not know how much fuel is being burned, it might be advisable in those study areas with substantial vessel activity to survey a representative number of vessels.

If such a survey is not feasible, and if local companies cannot estimate the quantity of fuel being used, the total vessel operations in the area should be determined. These data are available from officials of shipping lines, harbor authorities, and Waterborne Commerce of the United States.[10]

Air pollutant emissions resulting from vessel operations may be divided into two groups--emissions that occur when the ship is under way and emissions that occur when the ship is docked or in berth. Excluding the Great Lakes, vessel traffic, oil-fired vessels account for most of the shipping in the United States. When fuel data for ships are not available, rough estimates can be made from the total vessel operations in the study area. For underway emissions it can be assumed that a ship burns from 19 to 42 gallons of oil per mile (Chapter 5). At dockside, ships may burn from 660 to 1900 gallons per day maintaining utilities aboard ship--lights, heat, pumps, refrigeration, ventilation, etc. (Chapter 5). Furthermore, it can be assumed that a ship remains at dockside from 2 to 3 days. The miles of ship channels in each grid can be calculated from maps. The miles of docks can be apportioned to grids on the basis of location from map information or at least by visual observation of the dock area. Total dock area can be listed by percentages in grid zones, and miles of channels can be apportioned by percentages in each grid zone. Because the docking area may be spread throughout the study zone, it may be desirable to establish an average distance traveled by ships when under way in the study area. Then, assuming that all entering ships also leave, the estimated underway mileage must be doubled to account for underway emissions produced when entering and leaving port. This doubled mileage figure is then multiplied by the number of ships entering the port and by fuel consumption per mile to get the amount of oil burned per year by vessels under way.

The amount of oil burned at dockside is estimated by multiplying the average number of days in port (3 days) by the number of ships entering the port per year and by multiplying the result by the average fuel consumption per day while the ships are in port (for example, 1600 gallons per day is an average for the combined total of motorships and steamships). This computation gives the amount of oil burned in port per year. By the use of emission factors, total emissions from vessels under way and at dockside can be determined. These totals are then apportioned among the grids on the basis of the percentages of dock area and channel mileage existing in each grid zone.

Admittedly this method gives a rough estimate of emissions. It ignores tugboat operations, emissions from vessels maneuvering at dockside, differences in ship size, etc., but in many instances the emissions from vessels will be a negligible contribution to the total emissions. If vessel movement is a significant activity in the study area, better data will be available, and better estimates of emissions and their distribution by grid zone can be made.

7.4 APPORTIONING OF LOSSES FROM GASOLINE MARKETING TO GRIDS

Hydrocarbon evaporative losses for the study area are calculated with emission factors. Because many hours are required to locate all service stations and place them onto grids, an acceptable practice is to apportion the estimated emissions from service station operations on the basis of either population or vehicle miles. The gallonage estimated for motor vehicle use should be the basis for determining evaporative losses.

7.5 APPORTIONING OF SOLID WASTE DISPOSAL TO GRIDS

Burning in dumps and in some incinerators is considered a point source emission and is listed according to the UTM coordinates of the source. Emissions that must be apportioned as area sources include on-site incineration and on-site open burning. The grids in the county are rated on the basis of land-use, population density, and industrial and commercial development. The rating system could be established by estimating the percentage of each grid that is devoted to residential, commercial, and industrial use. The percentages for each category are totaled for the county, and the ratio of the percentage in the grid to the county total is used to distribute the emissions for each appropriate source category. Source information gathered according to the methods of Chapter 5 gives the percentage of solid waste that is industrial, commercial, or residential in origin. Once the quantities of solid waste in each category have been allocated to grids, emission factors can be applied to the solid waste disposal methods to determine quantities of pollutants released.

7.6 APPORTIONING OF RESIDENTIAL FUEL SOURCES TO GRIDS

Residential sources are considered to be area sources. If large apartment complexes use oil or coal as a fuel, it will be necessary to survey and pinpoint these complexes for more accurate pollutant calculations. These large sources are then easily located on the grid system as point sources; the area source classification remains. After residential fuel consumption data are obtained, it is necessary to obtain aid from local officials in apportioning these oil, coal, and gas data to the correct areas. When this type of information is not available, it is necessary to estimate the number of dwelling units in a given census tract that is using each type of fuel, based on the same percentage as the county or SMSA. Further apportioning will be necessary to reduce these data to a grid basis. References for obtaining countywide data on space heating are given in Section 7.2.

Example 7-2. Estimation of a Census Tract's Contribution of Space Heating Units to a Grid.

Given: (1970 Census Data)

I. Of 100,000 dwelling units (d. u.) in County A
10,000 d. u. use coal,
40,000 d. u. use oil,
35,000 d. u. use gas, and
15,000 d. u. use electricity.

II. Census tract 1 (CT-1) in County A has 5000 dwelling units.

III. It is estimated from a grid overlay of the County A census tract map that 20 percent (0.2) of CT-1 is in grid 4.

Calculations:

I. Electrical space heating is not considered an area source because the power-generating facility will be a point source of emissions at the location of the plant.

II. Number of space heating units in CT-1 that are in grid 4:

Coal: $\left(\frac{10{,}000 \text{ d. u. use coal}}{100{,}000 \text{ d. u. in county}}\right)$ (5,000 d. u. in CT-1) (0.2) = 100 d. u. use coal

Oil: $\left(\frac{40{,}000 \text{ d. u. use oil}}{100{,}000 \text{ d. u. in county}}\right)$ (5,000 d. u. in CT-1) (0.2) = 400 d. u. use oil

Gas: $\left(\frac{35{,}000 \text{ d. u. use gas}}{100{,}000 \text{ d. u. in county}}\right)$ (5,000 d. u. in CT-1) (0.2) = 350 d. u. use gas

In many instances it will be necessary to update census tract data before they can be apportioned onto the grids. City and county planning commissions usually have recent population and dwelling unit estimates by census tract. Below is a general technique for updating residential fuel usage (including space, water, heating, cooking, etc.) by census tract.

The following data must be available (either published or estimated):

1970 d. u. by census tract
1970 d. u. using coal for space heating by census tract
1970 d. u. using oil for space heating by census tract
1970 d. u. using gas for space heating by census tract
197X d. u. by census tract (estimated)

The percentage of units built since 1970 that use oil, gas, or electricity for heating must be determined (usually from local gas companies). Very few homes built since 1970 use coal as a heating fuel. Information is also needed on the percentage of homes that have converted fuel types since 1970. These conversions are usually from coal to gas, oil, or electricity. This information is also usually available from local utility companies. If there has been a decrease in the number of dwelling units for a given census tract, then a corresponding decrease should be made in the number of units using coal or oil. This adjustment is understandable because most of the razed units are older buildings, which tend to burn coal and oil.

It is assumed, unless known data indicate otherwise, that residential use of coal is for space-heating purposes only. Some oil and large amounts of gas are used for water heating and cooking, along with the normal usage for space heating.

From past experience, it has been found that 250 gallons of oil per year is consumed per water heating and cooking unit, and, unless known otherwise, this oil can be considered distillate oil. Using Census Bureau data on water heating and cooking units, oil usage for this purpose can be determined and then distributed in proportion to the number of dwelling units using oil for heating.

The natural gas usage for water heating and cooking for a county is the difference between the quantity supplied by the natural gas companies and that calculated for space heating using the dwelling unit data. The differential amount of gas is allocated to emission zones in proportion to the number of dwelling units using gas for heating.

Anthracite and bituminous coal, distillate and residual oil, natural gas, liquefied petroleum gas, and wood are used residentially. As previously shown in Chapter 5, anthracite and bituminous coal used commercially and residentially can be estimated for a given county.

Fuel requirements for space heating are a product of four factors--number of dwelling units, fuel consumption per dwelling unit based on degree-days, number of degree-days, and a factor that corrects for the average number of rooms in a house. Fuel consumption is based on the average of five rooms per dwelling. A correction factor is necessary if the average dwelling in the county does not have five rooms. Table 7-3 gives fuel consumption data for a five-room residence.

Table 7-3. AVERAGE FUEL CONSUMPTION FOR A FIVE-ROOM RESIDENCE[11]

Fuel	Consumption
Natural gas	22.5 ft^3/dwelling unit-degree-day
Fuel oil	0.18 gallon/dwelling unit-degree-day
Coal	0.00012 ton/dwelling unit-degree-day

The following example illustrates the procedures used to update and estimate residential fuel consumption.

Example 7-3. Updating and Estimating Residential Fuel Consumption by Grid.

Given:

I. 1970 county and census-tract data have been distributed onto grids. The following data are available for one grid in the county:

	County A	Grid 4
1970 population	300,000	10,000
1970 dwelling units (d. u.)	100,000	4,000
1970 d. u. using coal	10,000	500
1970 d. u. using oil	40,000	1,300
1970 d. u. using gas	35,000	1,800
1970 d. u. using electricity	15,000	400

II. Local planning commission population and housing estimates for County A in 1971 are as follows:

1. 1971 population 315,000
2. 1971 dwelling units 105,000
3. Five percent of County A dwelling units are in structures of 50 or more units. Assume that this holds true for grid 4 and that residual fuel oil is used in these structures for space heating.

III. Since 1970, according to the local gas company:

1. Ten percent of the dwelling units using coal have switched to gas.
2. Five percent of the dwelling units using oil have switched to gas.
3. Eighty percent of the homes built since 1970 are heated with gas and 20 percent with electricity.
4. Total residential gas sales for 1971 are 9.1×10^9 ft^3.

IV. Other:

1. In 1971, 20 percent of coal burned was anthracite and 80 percent was bituminous.
2. 1971 degree-days (°day) = 5.000 °day.
3. Average number of rooms per dwelling unit = 5.5 rooms.
4. Dwelling units in County A using oil for water heating = 21,000 d. u.

Calculations:

I. Update grid population from 1970 to 1971.

$$\left(\frac{315{,}000}{300{,}000}\right)\ (10{,}000\ \text{pop.}) = 10{,}500\ \text{population in grid 4}$$

II. Update grid housing data from 1970 to 1971.

$$\left(\frac{10{,}500}{10{,}000}\right)\ (4{,}000\ \text{d. u.}) = 4{,}200\ \text{d. u. in grid 4}$$

III. Estimate 1971 coal usage for space heating in grid 4

A. Dwelling units:

500 - (0.1) (500) = 450 d. u. using coal.

B. Tons:

$$(450\ \text{d. u.})\ \left(\frac{0.0012\ \text{tons coal}}{\text{d.u./°day}}\right)\ (5{,}000\ \text{°day})\ \left(\frac{5.5}{5}\right)^{*} = 2970\ \text{tons}$$

1. Anthracite coal burned = (2,970 tons) (0.2) = 594 tons
2. Bituminous coal burned = (2,970 tons - 594 tons) = 2376 tons

---

* This is the needed correction factor for the average number of rooms per dwelling unit when using Table 7-3.

IV. Estimate 1971 oil usage for space heating and water heating in grid 4.

A. Dwelling units:

40,000 - (0.05) (40,000) = 38,000 d. u. using oil in County A
1,300 - (0.05) (1,300) = 1,235 d. u. using oil in grid 4

B. Gallons:

(1,235 d. u.) $\left(0.18 \frac{\text{gallons oil}}{\text{d.u./°day}}\right)$ (5,000 °day) $\left(\frac{5.5}{5}\right)$* = 1,222,500 gallons fuel oil used in grid 4.

1. Residual: All used in space heating of structures of 50 units or more.
   (1,222,500 gallons fuel oil) (0.05) = 61,125 gallons residual fuel oil used in grid 4
2. Distillate, space heating:
   1,222,500 gallons fuel oil - 61,125 gallons residual = 1,161,375 gallons distillate fuel oil used for space heating in grid 4
3. Distillate, water heating:
   (1,235 d. u.) $\left(\frac{\text{20,000 d. u.}}{\text{30,000 d. u.}}\right)$ $\left(\frac{\text{250 gallons oil}}{\text{d. u.}}\right)$ = 162,500 gallons distillate fuel oil used for water heating in grid 4.

V. Estimate 1971 gas usage for space heating and other purposes (water heating, cooking, etc.).

A. Dwelling units:

The following formula is used in updating:

$$\begin{matrix}\text{1970} \\ \text{gas users}\end{matrix} + \begin{matrix}\text{Converted} \\ \text{from coal}\end{matrix} + \begin{matrix}\text{Converted} \\ \text{from oil}\end{matrix} + \begin{matrix}\text{New d. u.} \\ \text{using gas}\end{matrix} = \begin{matrix}\text{1971 d. u.} \\ \text{using gas}\end{matrix}$$

County: 35,000 + 1,000 + 2,000 + 5,000 (0.80) = 42,000 d. u.
Grid: 1,800 + 50 + 75 + 200 (0.80) = 2,085 d. u.

B. Cubic feet of gas used:

1. Space heating:
   County: (42,000 d.u.) $\left(22.5 \frac{\text{ft}^3}{\text{d.u./°day}}\right)$ (5,000 °day) $\left(\frac{5.5}{5}\right)$* = 5.2×10^9 ft^3 gas used in County A for space heating
   Grid: (2,085 d.u.) $\left(22.5 \frac{\text{ft}^3}{\text{d.u./°day}}\right)$ (5,000 °day) $\left(\frac{5.5}{5}\right)$* = 258×10^6 ft^3 gas used in grid 4 for space heating
2. Total gas used in grid 4:
   $\left(\frac{9.1 \times 10^9 \text{ ft}^3}{5.2 \times 10^9 \text{ ft}^3}\right)$ $(258 \times 10^6 \text{ ft}^3)$ = 451×10^6 ft^3 gas used in grid 4, total
3. Gas used in grid 4 for other purposes:
   $451 \times 10^6 \text{ ft}^3 - 258 \times 10^6 \text{ ft}^3 = 193 \times 10^6 \text{ ft}^3$ gas used in grid 4 for other purposes

---

* This is the needed correction factor for the average number of rooms per dwelling unit when using Table 7-3.

If the above fuel totals for space heating, water heating, cooking, etc. are used, emissions from residential sources can be apportioned onto grids. If large individual sources can be identified, their fuel usage should be subtracted from the grid or census tract total to give the area source residential fuel.

7.7 APPORTIONING OF COMMERCIAL AND INSTITUTIONAL SOURCES TO GRIDS

Large commercial and institutional sources should be surveyed by questionnaire or personal contact and classified as point sources. The fuel used by these sources can be subtracted from the total estimates of commercial and institutional fuel for the county. The remaining fuel for commercial and institutional sources can be apportioned to the grid zones based on a rating system that is appropriate for the county under consideration. Apportioning can be established through knowledge of the area, land-use maps, contacts with local officials, and USGS topographical maps.

7.8 APPORTIONING OF MISCELLANEOUS SOURCES TO GRIDS

The occurrences of construction and demolition, forest fires, brush burning, agricultural burning, orchard heating operations, plowing and tilling, coal refuse fires, and debris burning are usually known if such activities are significant in the study area. These activities can be classified as point sources and apportioned onto grids on this basis. Emission estimates may be difficult, however, in situations where emission factors are unavailable. For example, although adequate emission factors for dust emissions caused by plowing and tilling are presently unavailable, these operations may be a significant source of particulates during dry, windy periods.

Road dust is treated as an area source that can be distributed if data on vehicle miles traveled on dirt roads are available. The quantity of dust created, which may be great in some areas and of little concern in others, will vary from season to season. The dust generated per mile traveled must be estimated or determined for each area of interest.

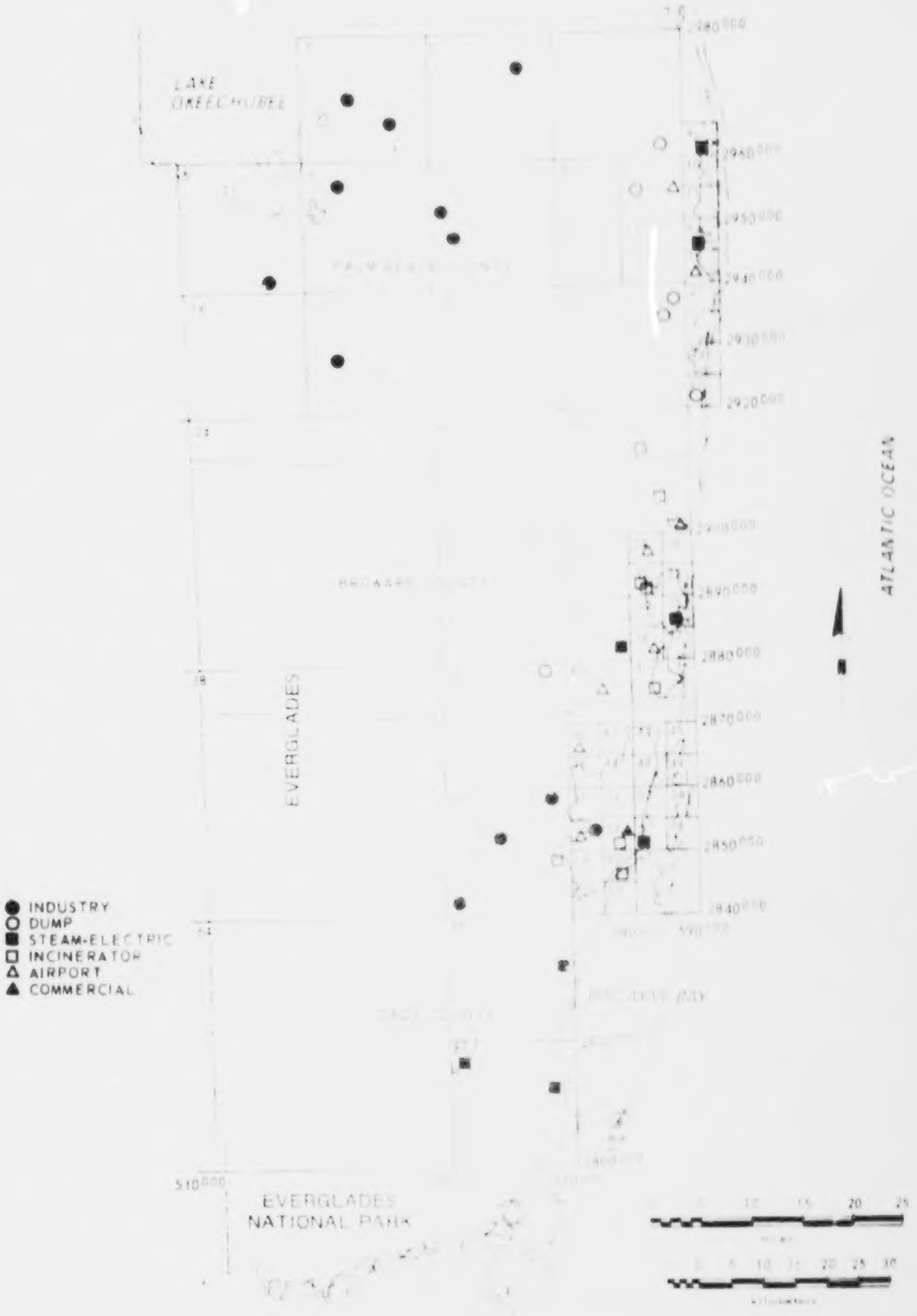
Industrial solvent losses are considered point source emissions and are apportioned accordingly. Commercial dry cleaning solvent losses are also best apportioned as point source emissions.

7.9 APPORTIONING OF POINT SOURCES TO GRIDS

Point source emissions are apportioned onto the grid zones using the UTM coordinates of the point source, as shown in Figure [illegible].

7.10 TOTALING GRIDDED EMISSIONS

For each grid the various point and area sources are now apportioned. For each surveyed pollutant in the grids, totals are summarized for annual average emissions and, generally, for summer and winter emissions also. This information can then be



LAKE OKEECHOBEE
PALM BEACH COUNTY
BROWARD COUNTY
DADE COUNTY
EVERGLADES
EVERGLADES NATIONAL PARK
ATLANTIC OCEAN
BISCAYNE BAY
2960000
2950000
2940000
2930000
2920000
2910000
2900000
2890000
2880000
2870000
2860000
2850000
2840000
510000
590000
● INDUSTRY
○ DUMP
■ STEAM-ELECTRIC
□ INCINERATOR
△ AIRPORT
▲ COMMERCIAL
0 5 10 15 20 25
miles
0 5 10 15 20 25 30
kilometers

Figure 7-6. Point source locations for example study area.[5]

presented as shown in Table 7-4. From this table emission density maps can be constructed for each pollutant as shown in Figures 7-7 through 7-9. In some cases, more than one air pollution jurisdiction may exist in the study area (city, county), and in such instances it is helpful to delineate the boundaries of the jurisdictions on the various maps. For agency purposes, a map utilizing shaded plastic overlays is desirable in comparing emission densities and geographic origin between pollutants. A suggested master map form is the USGS topographical series, which has the UTM grid ticks already established. This map is also extremely useful in comparing emission densities with possible sources shown on the map.

7.11 REFERENCES

1. Census of Population and Housing, General Characteristics for States, Cities, and Counties. PHS series. U.S. Department of Commerce, Bureau of the Census. Washington, D.C. 1970.
2. Census of Population and Housing, Detailed Characteristics for States, Cities, and Counties. PHS series. U.S. Department of Commerce, Bureau of the Census. Washington, D.C. 1970.
3. Census of Population and Housing, Census Tract Reports. PHS series. U.S. Department of Commerce, Bureau of the Census. Washington, D.C. 1970.
4. Census of Population and Housing, Number of Inhabitants. PHS series. U.S. Department of Commerce, Bureau of the Census. Washington, D.C. 1970.
5. McGraw, M. J. Miami-Fort Lauderdale-West Palm Beach Metropolitan Area Air Pollutant Emission Inventory. U.S. Department of Health, Education and Welfare, PHS, NAPCA. Durham, North Carolina. April 1970.
6. Automobile Facts and Figures. Automobile Manufacturers Association. Detroit, Michigan. 1965. p. 49-50.
7. Automotive Air Pollution. Second Report of the Secretary of Health, Education and Welfare to the United States Congress. U.S. Government Printing Office. Washington, D.C. June 1965.
8. Compilation of Air Pollutant Emission Factors. U.S. Environmental Protection Agency, Office of Air Programs. OAP Publication No. AP-42. Durham, North Carolina. February 1972.
9. Shipments of Fuel Oil and Kerosene. U.S. Department of the Interior, Bureau of Mines. Washington, D.C. 1970.
10. Waterborne Commerce of the United States. U.S. Department of the Army, Corps of Engineers. New Orleans, Louisiana. 1970.
11. Statewide Emissions Inventory for Oklahoma. U.S. Environmental Protection Agency, Region VI. Final report for EPA Contract No. 68-02-0042. Dallas, Texas. October 15, 1971.

Table 7-4. SUMMARY OF AIR POLLUTANT EMISSIONS FROM ALL SOURCES IN THE EXAMPLE STUDY AREA[5]
(tons/day)

Grid	Land Area	SOx			PARTICULATES			CO			HYDROCARBONS			NOx		
		S	W	A	S	W	A	S	W	A	S	W	A	S	W	A
1	154.4	0.4	0.8	0.5	24.7	24.7	24.7	7.3	7.7	7.4	94.1	94.1	94.1	0.3	0.4	0.3
2	154.4	3.7	6.1	4.3	0.4	0.6	0.4	0.8	1.6	1.1	233.2	233.2	233.2	1.5	2.6	1.8
3	154.4	0.2	0.3	0.2	0.5	0.8	0.6	27.0	52.8	35.6	191.3	191.3	191.3	1.9	3.7	2.5
4	9.6	107.7	77.5	76.1	3.4	2.8	2.6	27.7	55.1	36.8	5.2	7.8	5.9	39.1	30.0	28.4
5	154.4	0.7	1.4	0.9	14.4	14.5	14.5	7.0	7.2	7.1	94.0	94.1	94.0	0.3	0.5	0.4
6	154.4	0.3	0.5	0.3	25.2	25.2	25.2	26.9	27.6	27.1	189.3	189.3	189.3	0.6	0.7	0.7
7	154.4	0.7	1.1	0.8	7.5	7.5	7.5	22.8	26.2	24.0	236.0	236.0	236.0	0.8	1.1	0.9
8	38.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	69.8	69.8	69.8	0.1	0.1	0.1
9	38.6	0.2	0.5	0.3	1.3	1.6	1.4	28.3	44.9	33.8	29.3	31.7	30.1	2.3	3.8	2.7
10	9.6	0.3	1.0	0.5	0.3	0.7	0.4	35.1	69.7	46.7	5.0	8.2	6.1	1.2	3.0	1.7
11	9.6	0.5	1.4	0.7	0.4	0.9	0.6	46.3	91.9	61.5	6.8	10.9	8.1	1.5	4.0	2.3
12	38.6	0.0	0.1	0.0	0.1	0.1	0.1	4.6	9.2	6.1	70.5	71.1	70.7	0.4	0.7	0.5
13	38.6	0.2	0.4	0.3	0.4	0.7	0.5	29.9	59.4	39.7	5.5	9.7	6.9	2.1	4.1	2.8
14	9.6	0.7	1.5	0.9	0.5	1.0	0.7	47.6	94.6	63.3	7.0	12.0	8.7	3.5	5.9	3.9
15	9.6	0.4	1.1	0.6	0.5	0.8	0.6	28.5	52.8	36.6	5.4	8.3	6.4	1.6	3.6	2.2
16	154.4	0.0	0.0	0.0	1.0	1.0	1.0	6.5	6.5	6.5	256.8	256.8	256.8	0.1	0.1	0.1
17	154.4	0.3	0.6	0.4	13.5	13.5	13.5	26.1	26.1	26.1	259.1	259.1	259.1	0.6	0.6	0.6
18	154.4	0.0	0.0	0.0	3.1	3.1	3.1	19.5	19.5	19.5	258.3	258.3	258.3	0.4	0.4	0.4
19	154.4	0.2	0.4	0.3	0.6	0.9	0.7	29.5	57.5	38.9	146.7	146.7	146.7	2.2	4.1	2.8
20	9.6	0.2	0.6	0.3	0.2	0.4	0.3	13.3	26.2	17.6	2.6	4.3	3.2	0.9	2.0	1.2
21	9.6	0.1	0.4	0.2	0.2	0.3	0.2	9.1	17.9	12.0	2.0	3.1	2.4	0.6	1.5	0.9
22	9.6	0.6	0.7	0.7	0.2	0.3	0.2	10.3	20.4	13.7	2.1	3.4	2.6	0.7	1.3	0.9

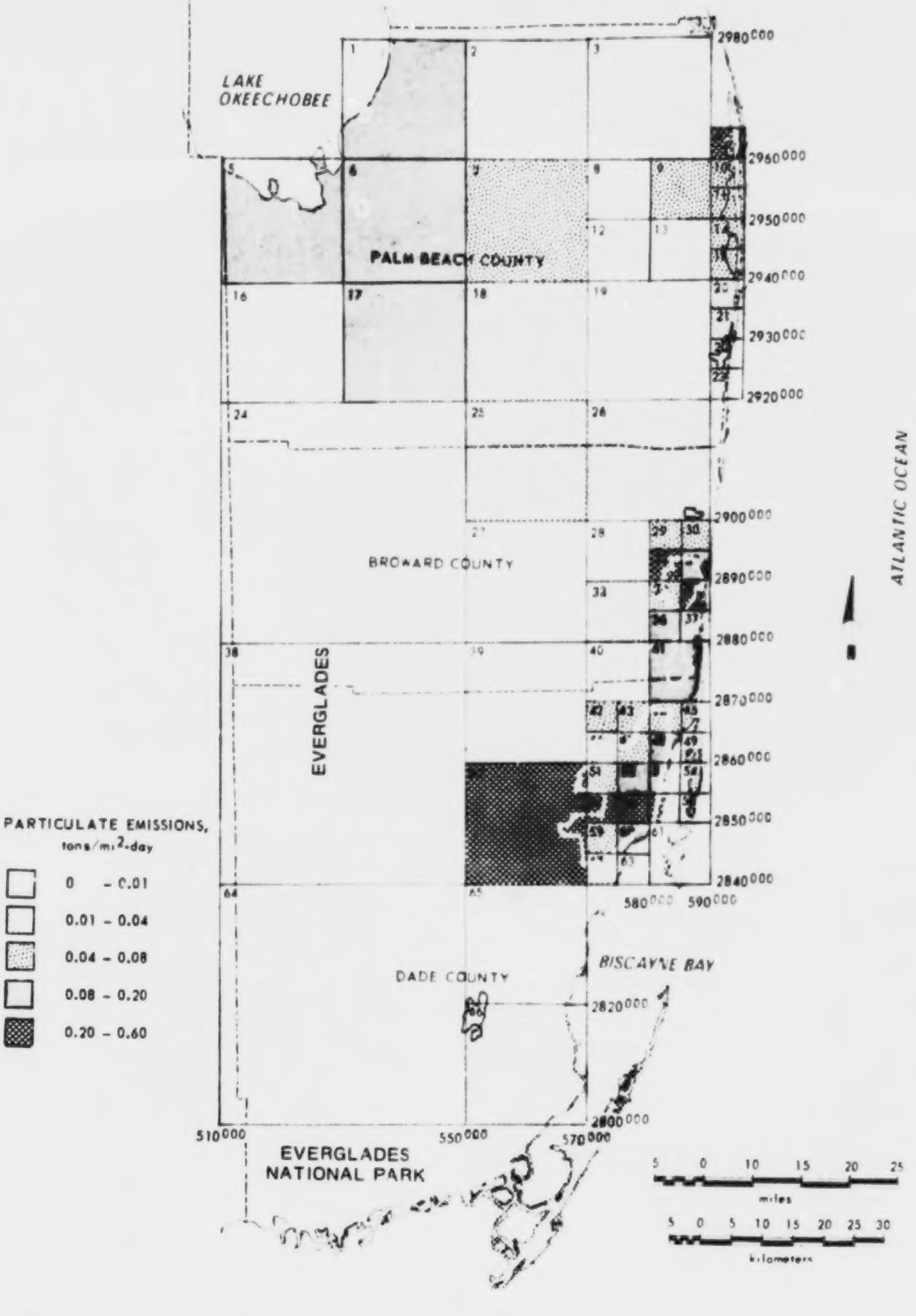

LAKE OKEECHOBEE
PALM BEACH COUNTY
BROWARD COUNTY
EVERGLADES
DADE COUNTY
BISCAYNE BAY
ATLANTIC OCEAN
EVERGLADES NATIONAL PARK
PARTICULATE EMISSIONS, tons/mi²-day
0 - 0.01
0.01 - 0.04
0.04 - 0.08
0.08 - 0.20
0.20 - 0.60
2980000
2960000
2950000
2940000
2930000
2920000
2900000
2890000
2880000
2870000
2860000
2850000
2840000
2820000
2800000
510000
550000
570000
580000
590000
miles
5 0 10 15 20 25
kilometers
5 0 5 10 15 20 25 30

Figure 7-7. Particulate emission densities from all sources in example study area.[5]

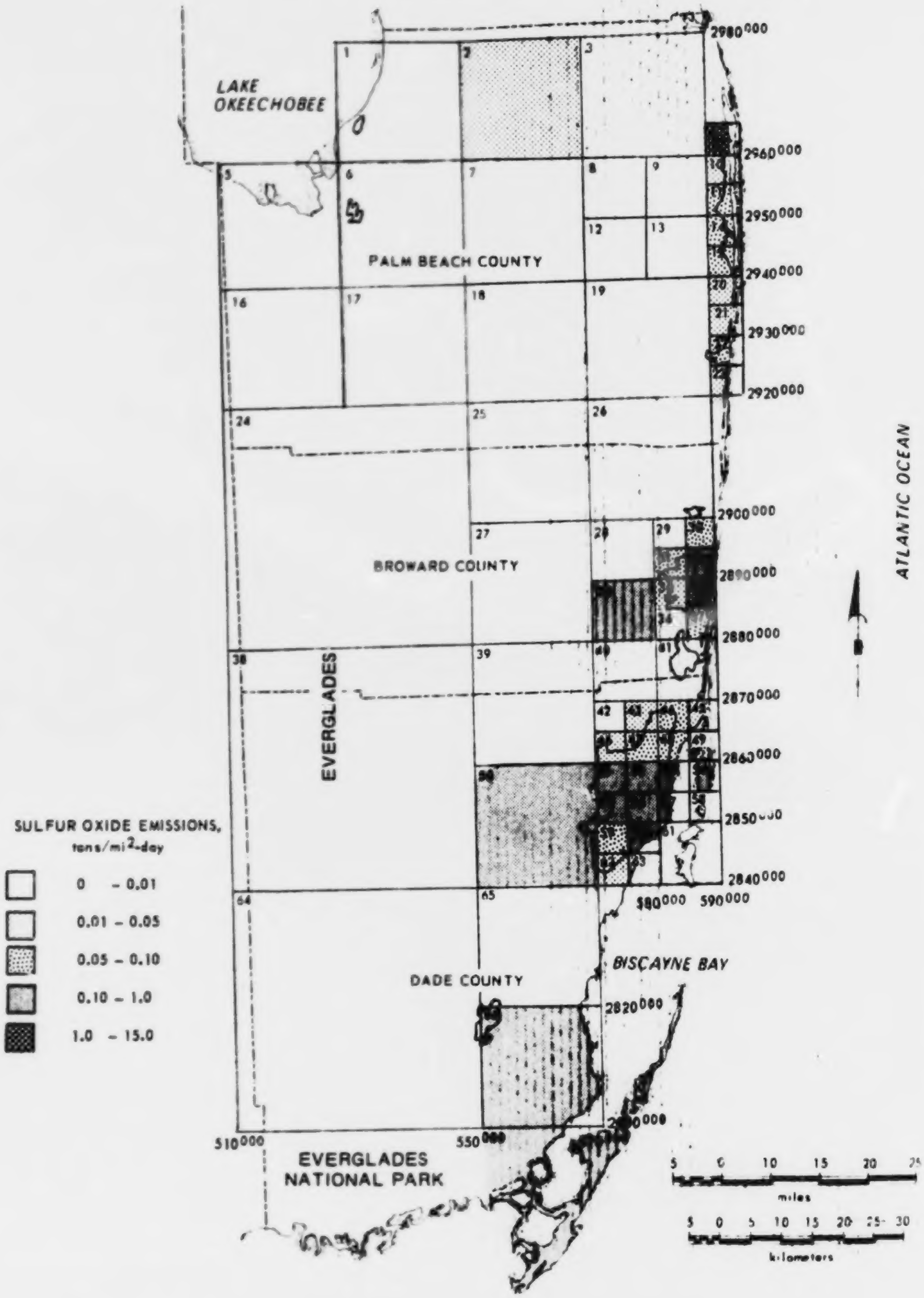

LAKE OKEECHOBEE
PALM BEACH COUNTY
BROWARD COUNTY
EVERGLADES
DADE COUNTY
BISCAYNE BAY
EVERGLADES NATIONAL PARK
ATLANTIC OCEAN
1
2
3
5
6
7
8
9
10
12
13
16
17
18
19
20
21
24
25
26
27
28
29
38
39
42
64
65
2980000
2960000
2950000
2940000
2930000
2920000
2900000
2890000
2880000
2870000
2860000
2850000
2840000
2820000
580000
590000
510000
550000
SULFUR OXIDE EMISSIONS,
tons/mi²-day
0 - 0.01
0.01 - 0.05
0.05 - 0.10
0.10 - 1.0
1.0 - 15.0
5 0 10 15 20 25
miles
5 0 5 10 15 20 25 30
kilometers

Figure 7-8. Sulfur oxides emission densities from all sources in example study area.[5]

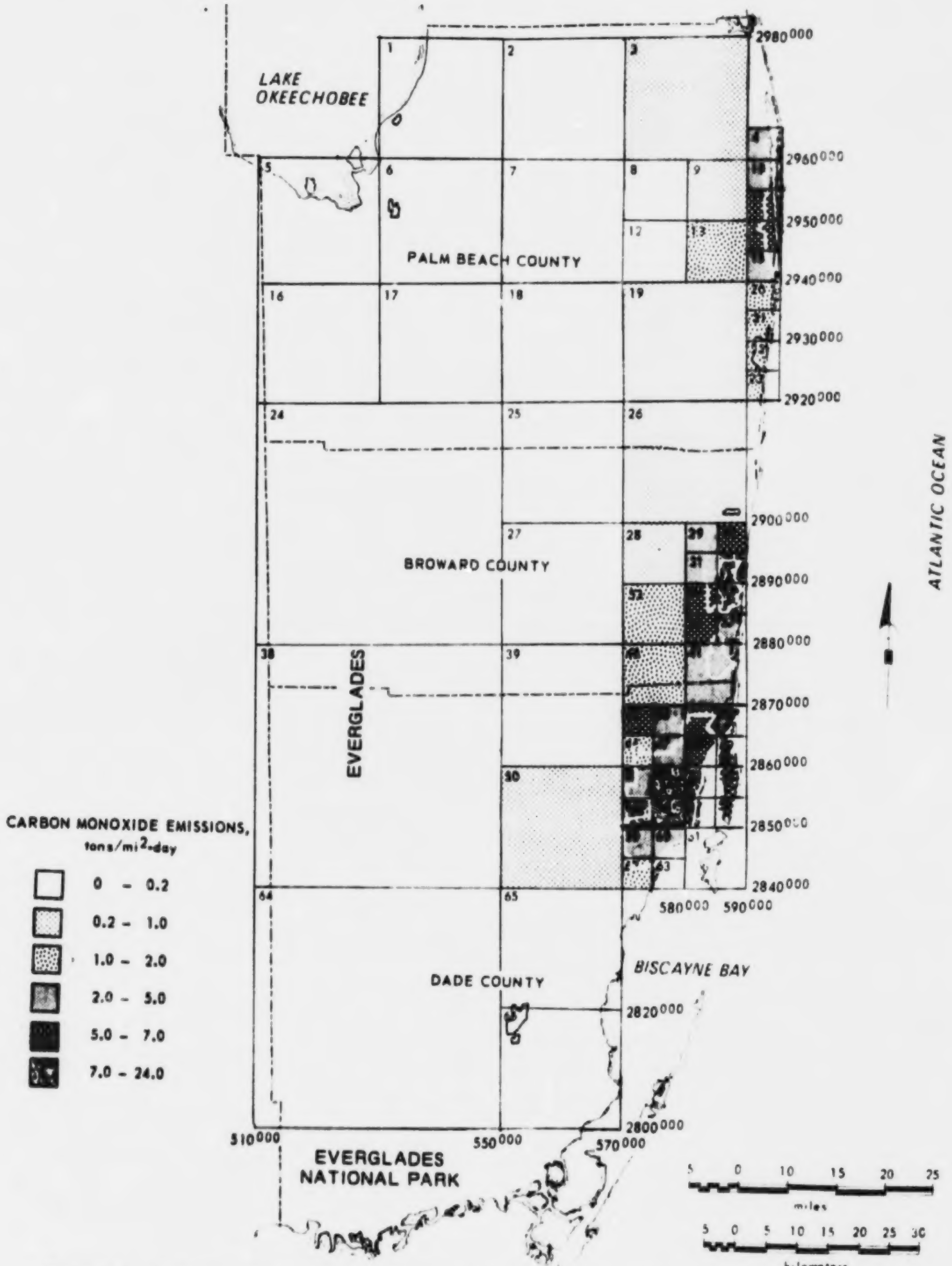

LAKE OKEECHOBEE
PALM BEACH COUNTY
BROWARD COUNTY
EVERGLADES
DADE COUNTY
BISCAYNE BAY
ATLANTIC OCEAN
EVERGLADES NATIONAL PARK
CARBON MONOXIDE EMISSIONS, tons/mi2-day
0 - 0.2
0.2 - 1.0
1.0 - 2.0
2.0 - 5.0
5.0 - 7.0
7.0 - 24.0
2980000
2960000
2950000
2940000
2930000
2920000
2900000
2890000
2880000
2870000
2860000
2850000
2840000
2820000
2800000
510000
550000
570000
580000
590000
miles
kilometers

Figure 7-9. Carbon monoxide emission densities from all sources in example study area.[5]

8. DISPERSION MODELING

8.1 INTRODUCTION

Dispersion modeling is a mathematical method of calculating the expected distribution of air pollutants over an area based on emission, meteorological, and topographical data for that area. To be able to "model" an area is one reason for obtaining an emission inventory. Because of the mathematical complexity of modeling, computers are often used to carry out the calculations. Although several methods are available for these calculations, only two are regularly used--the Air Quality Display Model[1] (AQDM), and the Air Quality Implementation Planning Program[2] (IPP). The latter is the more extensive because it incorporates cost control models and various control strategy options in addition to the dispersion modeling feature. Operational computer programs are available for both methods.

8.2 USES OF DIFFUSION MODELS

The basic output of a diffusion model is a prediction of pollutant concentration distribution. The distribution is usually displayed as a series of contours of constant concentrations (isopleths) on a map of the region. When air quality measurements are available, the model predictions at those sites are compared with the measured values, and a calibration diagram is produced. The correlation (r) between predicted and measured concentrations should be 0.7 or more. If r is less than 0.7, or if the isopleths show a pronounced excess or deficiency of concentration for no apparent reason, then errors in the source inventory are likely. Thus, a second use of the diffusion model is as a check on the accuracy of the source inventory.

Once the model has been calibrated or has been verified as giving a reasonable estimation of present or base-year conditions, it may be used to estimate the effect of future emission changes on air quality. These changes may be due to proposed emission regulations, expected new developments, or both. When data on fuel and other costs are added to a sufficiently detailed emission inventory, the costs of alternative control strategies (i.e., sets of emission limitations and fuel quality regulations) as well as their effectiveness may be estimated.

Finally, a computerized model may yield a list of the contributions of each point and area source to the concentrations at selected points. This source-contribution file is valuable in designing effective and economical control strategies.

8.3 EMISSION INVENTORY AND OTHER DATA NEEDED FOR MODELING

The emission data needed for dispersion modeling are more detailed than those that have normally been collected to date. Places for all emission data required are provided in the format. The data requirements for both IPP and AODM are:

A. Point Sources:
   1. Region.
   2. SIC code.
   3. Site number.
   4. Process code (Appendix A, Section 4).
   5. Descriptive name.
   6. UTM coordinates (nearest 100 meters).
   7. Political jurisdiction (e.g., county).
   8. Owner (public, private).
   9. Emission rate (tons per day for SO_2, particulates).
   10. Operating time (hr/yr).
   11. Shifts/day.
   12. Control device identification (Appendix A, Section 3).
   13. Control efficiency (percent for SO_2, particulates).
   14. Boiler capacity (10^6 Btu/hr).
   15. Fuel heat content (Btu/unit for coal, residual oil, distillate oil, gas).
   16. Fuel burned (units/day for coal, residual oil, distillate oil, and gas).
   17. Sulfur content (%).
   18. Coal ash content (%).
   19. Stack height (ft).
   20. Stack-gas temperature (^oF), exit-gas velocity (ft/sec), stack diameter (feet), normalized plume rise (ft^2/sec).
   21. Maximum process rate (10^2 lb/hr).
   22. Maximum exhaust gas velocity (10^2 actual ft^3/min).
   23. Use factor.

B. Area Sources:
   1. UTM coordinates, southwest corner of grid (nearest 100 meters).
   2. Emission density (tons per day-Rm^2 of SO_2, particulates).
   3. Average stack height (m).

   A semimanual computerized method of gridding and apportioning area sources is available and will considerably decrease the time requirements of this operation.

C. Other data: Modeling requirements and meteorological and topographical data; if a cost model is used, fuel and miscellaneous cost data. These data must be obtained elsewhere.

8.4 REFERENCES

1. Air Quality Display Model. TRW Systems Group. U.S. Environmental Protection Agency, NAPCA. Washington, D.C. November,1970.
2. Air Quality Display Model, Implementation Planning Program. TRW Systems Group. U.S. Environmental Protection Agency, NAPCA. Washington, D.C. November 1970.

9. QUESTIONNAIRES

9.1 GENERAL INFORMATION

The questionnaire for point sources is the most widely used and expeditious method of collecting emission inventory information. The use of the questionnaire can produce problems, especially if the "questionnaire survey" is not properly conducted. These problems may be grouped into two main categories: questionnaire design and survey administration.

The proper design includes establishment of a suitable format for the questionnaire, selection of the appropriate questions, proper wording of questions, and authorship of an appropriate cover letter. The basic rule is to design the questionnaire and the letter for the person who will be asked to complete it. When an engineer is designing a questionnaire, he may overlook the fact that the person who will complete the questionnaire may not have the benefit of a technical background in air pollution. Also, the respondent may not have benefit of the engineer's assistance when completing the forms.

The format of the questionnaire should be as simple and functional as possible. Time will be saved if the format design is such that a keypunch operator can code the information directly from the questionnaire onto the cards. The format should then be in line with the example coding form formats of Chapters 4 and 5. If the inventory is not computerized, the questionnaires might follow the format suggested by the example questionnaires in Appendix D. Only information that can be used should be solicited; the questions should be well spaced to ensure that they are easy to read, yet placed on as few pages as possible because most people tend to avoid long questionnaires. When writing the questions, use terminology with which the recipient will be familiar. Each question should be self-explanatory or accompanied by clear directions. All information that will be utilized should be asked for initially, thus avoiding requests for additional data at a later time. The agency may wish to coordinate the emission inventory with the establishment of a permit system or a source registration system.

The questionnaire should be accompanied by a letter of transmittal. The example in Appendix D shows the information that should be contained in this cover letter. Before the questionnaire is due to be returned, a second letter may be sent out reminding the recipient of the need for the completed questionnaire. The second letter is sent as a reminder only and should be worded so as not be be construed by the recipient as harassment on the part of the agency. When the completed questionnaire has been returned, a short letter of appreciation should be sent to the party returning the questionnaire.

The administrative portion of the questionnaire survey includes all operations necessary to have the completed questionnaires distributed and processed by the agency. The optimum procedure, which can be followed in the administrative portion, will minimize the amount of time spent by technical staff. These procedures will require secretarial, clerical, and keypunch help in the agency to be used whenever possible.

10. EPA DATA SYSTEM FOR ATMOSPHERIC EMISSIONS

10.1 CONCEPT OF NEDS

The concept of the computerized emissions data system was previously given in Figure 2-1; the data storage and identification files are shown on the left side of the diagram and the ADP operations are indicated on the right. Recently the National Source Inventory Section (NSIS) of OAP has begun to set up such a system for a nationwide emission inventory. The ADP and data bank are called the National Emissions Data System (NEDS) and utilize the formats for data storage (Appendix B), the ADP procedures, and the source inventory and emission factor methodology specified earlier in this text.

NEDS is made up of the main system as described by cards 1 through 6 of the point source form and cards 1 through 5 of the area source form, as well as a variable data subsystem. The main system has been explained in Chapters 4 and 5, and reference was made to part of the subsystem in Chapter 6. The format for the main system is fixed; however, for the variable data subsystem, a format will be defined for the usable columns 18 through 72 by the users as each card identification number is assigned. The identification number is composed of an alphabetic letter in column 77 and right-justified numbers (from 001 to 999) in columns 78 through 80. The result is that, for each point source, approximately 26,000 cards can be stored. Any user desiring storage space for sources may request assignment of number of variable data cards by merely submitting a proposed format (together with details for completion) to the National Source Inventory Section, which will check for conformity with previously developed procedures. For example, cards A001 through A999 will be used by the National Source Inventory Section for data pertinent to their requirements--such as A001 and A002 for hazardous pollutants and trace elements.

All emission factor information is stored separately in the emission factor file; this permits changes at any time in the emission factor files (about 900 cards) without modification to the source files (about 300,000 cards). The formats for storage in the source and emission factor files are given in Appendix B, Sections 1, 2, and 3; the SCC identification numbers are given in Appendix A, Section 2. After the data files for NEDS are completed, this valuable tool for decision-making and control strategies will likely become the major reference for EPA policy in which emissions are considered.

10.2 POINT AND AREA SOURCE INVENTORIES FOR NEDS

Point sources may be generally defined as sources that emit more than a specific amount of pollutant and are identified individually, whereas area sources emit less than the specific amount and are apportioned over some geographic area. This definition usually applies primarily to SO_x, NO_x, CO, hydrocarbons, and particulates.

For the purpose of the NEDS inventories discussed in this chapter, point sources of the above pollutants are defined in Appendix C. The current 100 ton/year minimum level of emissions for point sources may be lowered to some lesser value after the "100-ton inventory" for NEDS is complete.

The criterion for specifying as point sources those facilities that emit at least 100 tons of a contaminant per year is based on the probable degradation by such a facility of ground level air quality. If it is assumed that an installation emits no more than 100 tons per year of a contaminant from a low stack, that it is located in an area where the average wind speed is less than the average throughout the country, that no wind direction occurs more often than 25 percent of the time at the site, and that atmospheric stability conditions in the vicinity occur with normal frequency, then the area most contaminated by the emissions would experience an annual average concentration of 5 to 8 micrograms per cubic meter. This concentration is about 10 percent of the secondary Federal annual air quality standard for sulfur dioxide or particulate matter.

Therefore, for the purpose of NEDS, it is conservative to classify as point sources only those facilities that emit at least 100 tons per year of the pollutants listed above. When considering hazardous (or potentially hazardous) pollutants or trace elements and compounds, point sources would be identified as every known emitter. When considering an inventory of selected source categories or source ownerships (Federal facilities, for example) every emitter would be listed. In many parts of the United States, emissions from Federal facilities may contribute to the total quantity of air pollutants in the area; therefore, source inventories of "federally-owned facilities" are being incorporated into the NEDS system by NSIS, OAP.

In NEDS, area sources are all sources of emissions not included as point sources; area source data are compiled on a countywide basis for both stationary and mobile sources. It is anticipated that gridding and apportioning techniques currently under development will facilitate conversion of the countywide totals to smaller areas for dispersion modeling. The countywide totals for area sources will also be compatible with the county identification numbers used on point sources, thereby permitting compilation of a nationwide inventory that will be subdivided into states and counties.

10.3 EMISSION FACTORS FOR NEDS

When fully operational, NEDS will automatically calculate emissions using the most up-to-date emission factors and current population data. The emission factor file will be periodically updated as new source test data become available; thus the computerized system will always use the best emission factors possible.

It will also be possible to compare the estimated emissions as stored in the data bank with the calculated emissions, and, by checking that the estimated emissions were a result of source tests, to make some quality judgment of the calculated emissions in general.

10.4 DATA RETRIEVAL ACCESS FOR NEDS

Any state or local agency that chooses to may request data from NEDS by telephone, mail, or, in future, by terminal access of the computer at the Research Triangle Park National Environmental Research Center.

Generally, three categories of data will be available: summaries, which will be most commonly used; sorting, a useful tool to be developed after summary techniques are finalized; and special analyses, techniques that will necessitate both terminal and programming capability. Each category is discussed below.

10.4.1 Summaries

A number of programs are under development that will provide the following summaries:

1. Nationwide inventory - by county (3,300), AQCR (247), state and territories (54), and the nation (1).
2. Area sources - by county (3,300), including tabulated data of cards 1 through 5 and calculated emissions of pollutants.
3. Point sources - individually (40,000) by county, including tabulated data of cards 1, 2, 3, 4, 5, 6 and calculated emissions of pollutants, trace elements and compounds.

10.4.1.1 Simple Summary Data Requests - Very brief data requests will be answered from monthly summaries or from the summaries output on the last day of the year (annual summaries). Annual summaries will be maintained for ADP and in computer printout form, stored on microfiche in NSIS. Monthly summaries will only be maintained on computer tape for ADP. The methods of answering simple requests are as follows:

1. Telephone requests to NSIS - Immediate answer will be given by telephone or, if many numbers are required, photocopies of the annual summaries from the microfiche will be mailed on the same day as the request, directed to the Chief, Air Branch of the EPA Regional Office for the area from which the request originated. The material will then be forwarded from the Regional Office, and in this manner confidentiality of data will be the responsibility of the Regional Office.
2. Mail requests to NSIS - Photocopies of summaries will be mailed in the same manner as for telephone requests.
3. Terminal requests to the computer - Immediate turnaround should be possible from monthly summaries.

10.4.1.2 Comprehensive Summary Data Requests - More complicated requests will probably require access of the computer by NSIS.

1. Telephone requests to NSIS - Five-day turnaround from the data received by NSIS is anticipated to enable NSIS to access the computer, obtain printout from monthly summaries, and mail to the regional air branch chief for forwarding.
2. Mail requests to NSIS - Such requests are handled in the same manner as telephone requests.
3. Terminal requests to the computer - Immediate turnaround should be possible from monthly summaries.

10.4.2 Sorting

A number of programs will be developed that will enable sorting and ranking of data. The methods for answering these requests will be the same as for comprehensive requests of summary data, except that sorting and/or ranking operations will be included.

10.4.3 Special Analysis

No programs will be developed for these operations; therefore, users must have their own programming capability until this need can be met by increased resources in NSIS.

10.5 UPDATING AND MAINTENANCE FOR NEDS

Three methods of updating the source files will be used:

1. New and modified source semi-annual reports - These reports will be routed to NSIS for use in revising source data.

2. Revisions - Any suggested revisions by local agencies, regional offices, etc. should be submitted by letter, telephone, or through computer terminal. The changes will be incorporated the last day of each month by NSIS.

3. NSIS "audit" procedures - Checks of the inventory will be made by selecting source categories, pollutants, or geographical areas to be investigated in depth by NSIS using available reports, data, etc. collected from a multitude of references.

The emission factors data file will be updated continuously as new information on source testing becomes available.

APPENDIX A
COMPREHENSIVE EMISSION INVENTORY IDENTIFICATION CODES

A.1 GEOGRAPHICAL IDENTIFICATION CODES

Environmental Protection Agency Regions are delineated and identified in Figure A-1. State and Air Quality Control Region (AQCR) numbers are listed following this figure. The states and the District of Columbia are listed alphabetically, and identification numbers are assigned sequentially. AQCR's are arranged alphabetically within each state according to the name specified in the Federal Register. The AQCR's are then numbered sequentially, following the same arrangement of states used for the state identification. Interstate AQCR's are included within the lowest-numbered state. AQCR's have been established for Puerto Rico, American Samoa, Guam, and the U.S. Virgin Islands. These AQCR's follow those of the states.

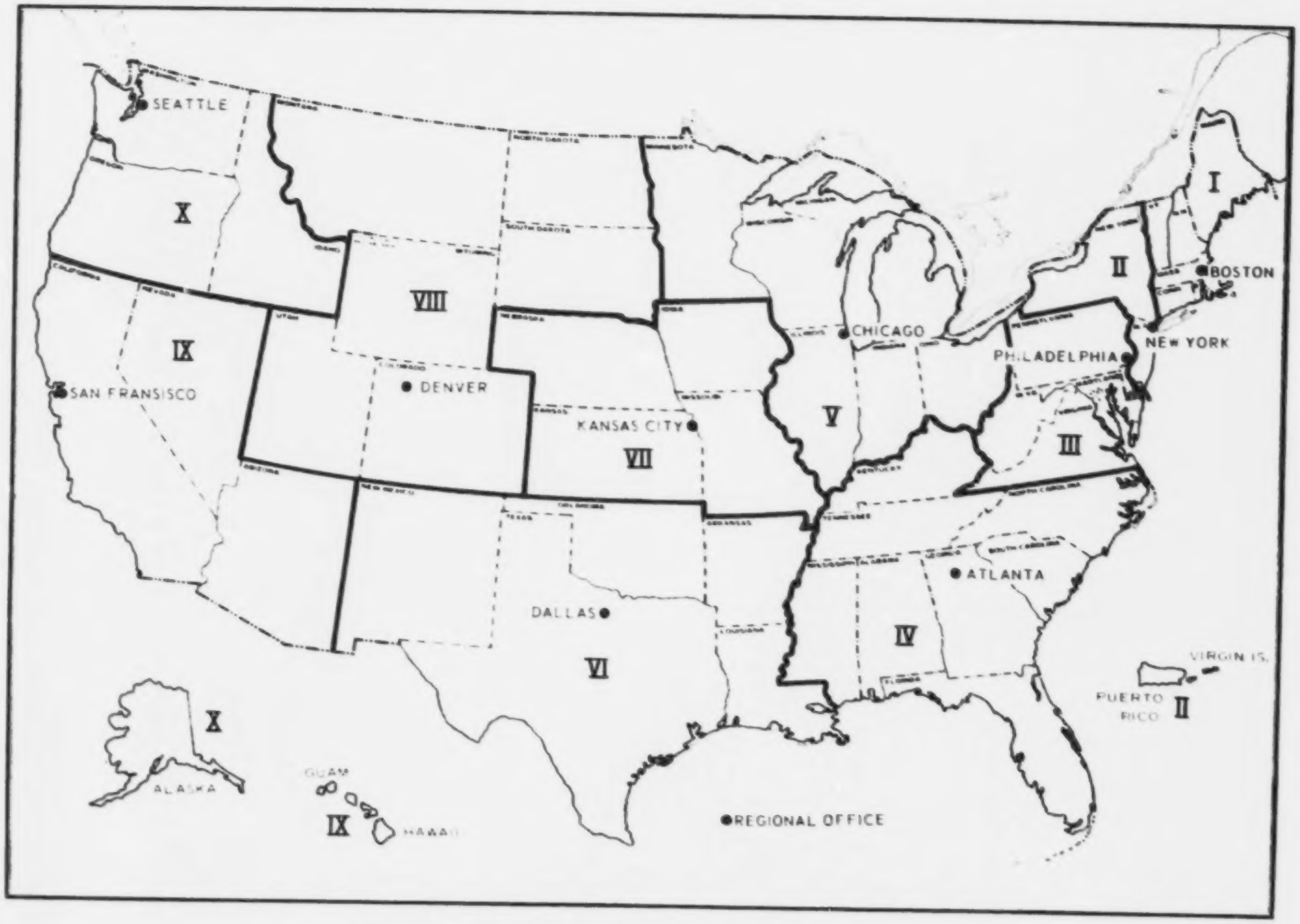

SEATTLE
X
VIII
IX
SAN FRANSISCO
DENVER
KANSAS CITY
VII
CHICAGO
V
I
II
BOSTON
NEW YORK
PHILADELPHIA
III
ATLANTA
IV
DALLAS
VI
VIRGIN IS.
PUERTO RICO
II
X
ALASKA
GUAM
IX
HAWAII
REGIONAL OFFICE

Figure A-1. Environmental Protection Agency Regions.

A.1.2 State Identification Numbers

State	Number
Alabama	01
Alaska	02
Arizona	03
Arkansas	04
California	05
Colorado	06
Connecticut	07
Delaware	08
District of Columbia	09
Florida	10
Georgia	11
Hawaii	12
Idaho	13
Illinois	14
Indiana	15
Iowa	16
Kansas	17
Kentucky	18
Louisiana	19
Maine	20
Maryland	21
Massachusetts	22
Michigan	23
Minnesota	24
Mississippi	25
Missouri	26
Montana	27
Nebraska	28
Nevada	29
New Hampshire	30
New Jersey	31
New Mexico	32
New York	33
North Carolina	34
North Dakota	35

State	Number
Ohio	36
Oklahoma	37
Oregon	38
Pennsylvania	39
Puerto Rico	40
Rhode Island	41
South Carolina	42
South Dakota	43
Tennessee	44
Texas	45
Utah	46
Vermont	47
Virginia	48
Washington	49
West Virginia	50
Wisconsin	51
Wyoming	52
American Samoa	53
Guam	54
Virgin Islands	55

A.1.3 Air Quality Control Region Identification Numbers

Region	Number
Alabama	
Alabama and Tombigbee Rivers	1
Columbus-Phenix City	2
East Alabama	3
Metropolitan Birmingham	4
Mobile-Pensacola-Panama City-Southern Mississippi (Fla., Miss.)	5
Southeast Alabama	6
Tennessee River Valley-Cumberland Mts. (Tenn.)	7
Alaska	
Cook Inlet	8

Region	Number
Alaska	
Northern Alaska	9
South Central Alaska	10
Southeastern Alaska	11
Arizona	
Arizona-New Mexico Southern Border (N. Mex.)	12
Clark-Mohave	13
Four Corners (Colo., N. Mex., Utah)	14
Phoenix-Tucson	15
Arkansas	
Central Arkansas	16
Metropolitan Fort Smith	17
Metropolitan Memphis	18
Monroe-El Dorado (La.)	19
Northeast Arkansas	20
Northwest Arkansas	21
Shreveport-Texarkana-Tyler (La., Okla., Texas)	22
California	
Great Basin Valley	23
Metropolitan Los Angeles	24
North Central Coast	25
North Coast	26
Northeast Plateau	27
Sacramento Valley	28
San Diego	29
San Francisco Bay Area	30
San Joaquin Valley	31
South Central Coast	32
Southeast Desert	33

Region	Number
Colorado	
Comanche	34
Four Corners (Ariz., N. Mex., Utah)	14
Grand Mesa	35
Metropolitan Denver	36
Pawnee	37
San Isabel	38
San Luis	39
Yampa	40
Connecticut	
Eastern Connecticut	41
Hartford-New Haven-Springfield (Mass.)	42
New Jersey-New York-Connecticut (N. J., N. Y.)	43
Northwestern Connecticut	44
Delaware	
Metropolitan Philadelphia (N. J., Pa.)	45
Southern Delaware	46
District of Columbia	
National Capital (Md.)	47
Florida	
Central Florida	48
Jacksonville-Brunswick (Ga.)	49
Mobile-Pensacola-Panama City-Southern Mississippi (Ala., Miss.)	5
Southeast Florida	50
Southwest Florida	51
West Central Florida	52
Georgia	
Augusta-Aiken (S. C.)	53
Central Georgia	54

Region	Number
Georgia	
Chattanooga (Tenn.)	55
Columbus-Phenix City (Ala.)	2
Jacksonville-Brunswick (Fla.)	49
Metropolitan Atlanta	56
Northeast Georgia	57
Savannah-Beaufort (S. C.)	58
Southwest Georgia	59
Hawaii	
Entire State	60
Idaho	
Eastern Idaho	61
Eastern Washington-Northern Idaho (Wash.)	62
Idaho	53
Metropolitan Boise	64
Illinois	
Burlington-Keokuk (Iowa)	65
East Central Illinois	66
Metropolitan Chicago (Ind.)	67
Metropolitan Dubuque (Iowa, Wisc.)	68
Metropolitan Quad Cities (Iowa)	69
Metropolitan St. Louis (Mo.)	70
North Central Illinois	71
Paducah-Cairo (Ky.)	72
Rockford-Janesville-Beloit (Wisc.)	73
Southeast Illinois	74
West Central Illinois	75
Indiana	
East Central Indiana	76

Region	Number
Indiana	
Evansville-Owensboro-Henderson (Ky.)	77
Louisville (Ky.)	78
Metropolitan Chicago (Ill.)	67
Metropolitan Cincinnati (Ky., Ohio)	79
Metropolitan Indianapolis	80
Northeast Indiana	81
South Bend-Elkhart-Benton Harbor (Mich.)	82
Southern Indiana	83
Wabash Valley	84
Iowa	
Burlington-Keokuk (Ill.)	65
Metropolitan Dubuque (Ill., Wisc.)	68
Metropolitan Omaha-Council Bluffs (Neb.)	85
Metropolitan Quad Cities (Ill.)	69
Metropolitan Sioux City (Neb., S. D.)	86
Metropolitan Sioux Falls (S. D.)	87
Northeast Iowa	88
North Central Iowa	89
Northwest Iowa	90
Southeast Iowa	91
South Central Iowa	92
Southwest Iowa	93
Kansas	
Metropolitan Kansas City (Mo.)	94
Northeast Kansas	95
North Central Kansas	96
Northwest Kansas	97
Southeast Kansas	98

Region	Number
Kansas	
South Central Kansas	99
Southwest Kansas	100
Kentucky	
Appalachian	101
Bluegrass	102
Evansville-Owensboro-Henderson (Ind.)	77
Huntington-Ashland-Portsmouth-Ironton (Ohio, W. Va.)	103
Louisville (Ind.)	78
Metropolitan Cincinnati (Ind., Ohio)	79
North Central Kentucky	104
Paducah-Cairo (Ill.)	72
South Central Kentucky	105
Louisiana	
Monroe-El Dorado (Ark.)	19
Shreveport-Texarkana-Tyler (Ark., Okla., Texas)	22
Southern Louisiana-Southeast Texas (Texas)	106
Maine	
Androscoggin Valley (N. H.)	107
Aroostook	108
Down East	109
Metropolitan Portland	110
Northwest Maine	111
Maryland	
Central Maryland	112
Cumberland-Keyser (W. Va.)	113
Eastern Shore	114
Metropolitan Baltimore	115
National Capital (D. C.)	47
Southern Maryland	116

Region	Number
Massachusetts	
Berkshire	117
Central Massachusetts	118
Hartford-New Haven-Springfield (Conn.)	42
Metropolitan Boston	119
Metropolitan Providence (R. I.)	120
Merrimack Valley-Southern New Hampshire (N. H.)	121
Michigan	
Central Michigan	122
Metropolitan Detroit-Port Huron	123
Metropolitan Toledo (Ohio)	124
South Bend-Elkhart-Benton Harbor (Ind.)	82
South Central Michigan	125
Upper Michigan	126
Minnesota	
Central Minnesota	127
Southeast Minnesota-La Crosse (Wisc.)	128
Duluth-Superior (Wisc.)	129
Metropolitan Fargo-Moorhead (N. D.)	130
Minneapolis-St. Paul	131
Northwest Minnesota	132
Southwest Minnesota	133
Mississippi	
Metropolitan Memphis (Ark., Tenn.)	18
Mississippi Delta	134
Mobile-Pensacola-Panama City-Southern Mississippi (Ala., Fla.)	5
Northeast Mississippi	135

Region	Number
Missouri	
Metropolitan Kansas City (Kans.)	94
Metropolitan St. Louis (Ill.)	70
Northern Missouri	137
Southeast Missouri	138
Southwest Missouri	139
Montana	
Billings	140
Great Falls	141
Helena	142
Miles City	143
Missoula	144
Nebraska	
Lincoln-Beatrice-Fairbury	145
Metropolitan Omaha-Council Bluffs (Iowa)	85
Metropolitan Sioux City (Iowa, S. D.)	86
Nebraska	146
Nevada	
Clark-Mohave (Ariz.)	13
Nevada	147
Northwest Nevada	148
New Hampshire	
Androscoggin Valley (Maine)	107
Merrimack Valley-Southern New Hampshire (Mass.)	121
New Hampshire	149
New Jersey	
Metropolitan Philadelphia (Dela., Pa.)	45
New Jersey	150
New Jersey-New York-Connecticut (N. Y., Conn.)	43
Northeast Pennsylvania-Upper Delaware Valley (Pa.)	151

Region	Number
New Mexico	
Albuquerque-Mid Rio Grande	152
Arizona-New Mexico Southern Border (Ariz.)	12
El Paso-Las Cruces-Alamogordo (Texas)	153
Four Corners (Ariz., Colo., Utah)	14
Northeastern Plains	154
Pecos-Permian Basin	155
Southwestern Mountains-Augustine Plains	156
Upper Rio Grande Valley	157
New York	
Central New York	158
Champlain Valley (Vt.)	159
Genesse-Finger Lakes	160
Hudson Valley	161
New Jersey-New York-Connecticut (N. J., Conn.)	43
Niagara Frontier	162
Southern Tier East	163
Southern Tier West	164
North Carolina	
Eastern Mountain	165
Eastern Piedmont	166
Metropolitan Charlotte (S. C.)	167
Northern Coastal Plain	168
Northern Piedmont	136
Sandhills	169
Southern Coastal Plain	170
Western Mountain	171
North Dakota	
Metropolitan Fargo-Moorhead (Minn.)	130
North Dakota	172

Region	Number
Ohio	
Dayton	173
Greater Metropolitan Cleveland	174
Huntington-Ashland-Portsmouth-Ironton (Ky., W. Va.)	103
Mansfield-Marion	175
Metropolitan Cincinnati (Ind., Ky.)	79
Metropolitan Columbus	176
Metropolitan Toledo (Mich.)	124
Northwest Ohio	177
Northwest Pennsylvania-Youngstown (Pa.)	178
Parkersburg-Marietta (W. Va.)	179
Sandusky	180
Steubenville-Weirton-Wheeling (W. Va.)	181
Wilmington-Chillicothe-Logan	182
Zanesville-Cambridge	183
Oklahoma	
Central Oklahoma	184
Metropolitan Fort Smith (Ark.)	17
North Central Oklahoma	185
Northeastern Oklahoma	186
Northwestern Oklahoma	187
Shreveport-Texarkana-Tyler (Ark., La., Texas)	22
Southeastern Oklahoma	188
Southwestern Oklahoma	189
Oregon	
Central Oregon	190
Eastern Oregon	191
Northwest Oregon	192
Portland (Wash.)	193
Southwest Oregon	194

Region	Number
Pennsylvania	
Central Pennsylvania	195
Metropolitan Philadelphia (Dela., N. J.)	45
Northeast Pennsylvania-Upper Delaware Valley (N. J.)	151
Northwest Pennsylvania-Youngstown (Ohio)	178
South Central Pennsylvania	196
Southwest Pennsylvania	197
Rhode Island	
Metropolitan Providence (Mass.)	120
South Carolina	
Augusta-Aiken (Ga.)	53
Camden-Sumter	198
Charleston	199
Columbia	200
Florence	201
Greenville-Spartanburg	202
Greenwood	203
Georgetown	204
Metropolitan Charlotte (N. C.)	167
Savannah-Beaufort (Ga.)	58
South Dakota	
Black Hills-Rapid City	205
Metropolitan Sioux City (Iowa, Neb.)	86
Metropolitan Sioux Falls (Iowa)	87
South Dakota	206
Tennessee	
Chattanooga (Ga.)	55
Eastern Tennessee-Southwestern Virginia (Va.)	207
Metropolitan Memphis (Ark., Miss.)	18

Region	Number
Tennessee	
Middle Tennessee	208
Tennessee River Valley-Cumberland Mountains (Ala.)	7
Western Tennessee	209
Texas	
Abilene-Wichita Falls	210
Amarillo-Lubbock	211
Austin-Waco	212
Brownsville-Laredo	213
Corpus Christi-Victoria	214
El Paso-Las Cruces-Alamagordo (N. M.)	153
Metropolitan Dallas-Ft. Worth	215
Metropolitan Houston-Galveston	216
Metropolitan San Antonio	217
Midland-Odessa-San Angelo	218
Shreveport-Texarkana-Tyler (Ark., La., Okla.)	22
Southern Louisiana-Southeast Texas (La.)	106
Utah	
Four Corners (Ariz., Colo., N. M.)	14
Utah	219
Wasatch Front	220
Vermont	
Champlain Valley (N. Y.)	159
Vermont	221
Virginia	
Central Virginia	222
Eastern Tennessee-Southwestern Virginia (Tenn.)	207
Hampton Roads	223
National Capital (D. C., Md.)	47

Region	Number
Virginia	
Northeastern Virginia	224
State Capital	225
Valley of Virginia	226
Washington	
Eastern Washington-Northern Idaho (Idaho)	62
Northern Washington	227
Olympia-Northwest Washington	228
Portland (Ore.)	193
Puget Sound	229
South Central Washington	230
West Virginia	
Allegheny	231
Central West Virginia	232
Cumberland-Keyser (Md.)	113
Eastern Panhandle	233
Huntington-Ashland-Portsmouth-Ironton (Ky., Ohio)	103
Kanawha Valley	234
North Central West Virginia	235
Parkersburg-Marietta (Ohio)	179
Southern West Virginia	236
Steubenville-Wierton-Wheeling (Ohio)	181
Wisconsin	
Duluth-Superior (Minn.)	129
Lake Michigan	237
Metropolitan Dubuque (Ill., Iowa)	68
North Central Wisconsin	238
Rockford-Janesville-Beloit (Ill.)	73
Southeastern Wisconsin	239

Region	Number
Wisconsin	
Southeast Minnesota-La Crosse (Minn.)	128
Southern Wisconsin	240
Wyoming	
Casper	241
Metropolitan Cheyenne	242
Wyoming	243
Puerto Rico	
Puerto Rico	244
American Samoa	
American Samoa	245
Guam	
Guam	246
U. S. Virgin Islands	
U. S. Virgin Islands	247

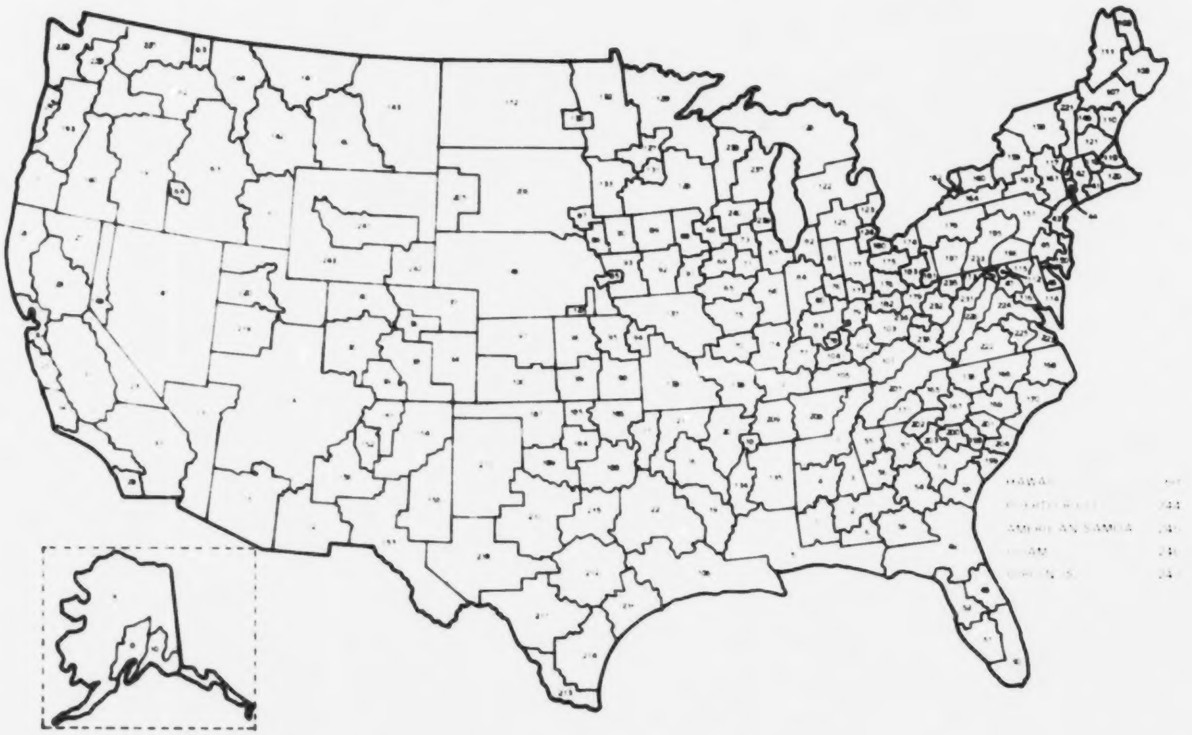

HAWAII
AMERICAN SAMOA
GUAM

Figure A-2 Federal Air Quality Control Regions

A.2 SOURCE CLASSIFICATION CODES

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
  SCC ID                                  SCC CATEGORY NAMES
  ******                                 ********************
I II III IV           I                 II                  III                IV                  UNITS

1 01 001 01 EXTCOMB BOILER   |ELECTRIC GENERATN|ANTHRACITE COAL  |>100MMBTU PULVIZD|TONS BURNED
1 01 001 02 EXTCOMB BOILER   |ELECTRIC GENERATN|ANTHRACITE COAL  |>100MMBTU STOKERS|TONS BURNED
1 01 001 03 EXTCOMB BOILER   |ELECTRIC GENERATN|ANTHRACITE COAL  |10-100MMBTU PULVD|TONS BURNED
1 01 001 04 EXTCOMB BOILER   |ELECTRIC GENERATN|ANTHRACITE COAL  |10-100MMBTU STOKR|TONS BURNED
1 01 001 05 EXTCOMB BOILER   |ELECTRIC GENERATN|ANTHRACITE COAL  |<10MMBTU PULVIZED|TONS BURNED
1 01 001 06 EXTCOMB BOILER   |ELECTRIC GENERATN|ANTHRACITE COAL  |<10MMBTU STOKER  |TONS BURNED
1 01 001 99 EXTCOMB BOILER   |ELECTRIC GENERATN|ANTHRACITE COAL  |OTHER/NOT CLASIFD|TONS BURNED
1 01 002 01 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |>100MMBTU PULVWET|TONS BURNED
1 01 002 02 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |>100MMBTU PULVDRY|TONS BURNED
1 01 002 03 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |>100MMBTU CYCLONE|TONS BURNED
1 01 002 04 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |>100MMBTU SPDSTKR|TONS BURNED
1 01 002 05 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |>100MMBTU/HR UFSK|TONS BURNED
1 01 002 06 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |10-100MMBTU PULWT|TONS BURNED
1 01 002 07 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |10-100MMBTU PULDY|TONS BURNED
1 01 002 08 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |10-100MMBTU OFSTK|TONS BURNED
1 01 002 09 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |10-100MMBTU UFSTK|TONS BURNED
1 01 002 10 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |<10MMBTU OFSTOKER|TONS BURNED
1 01 002 11 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |<10MMBTU UFSTOKER|TONS BURNED
1 01 002 12 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |<10MMBTU PULV-DRY|TONS BURNED
1 01 002 99 EXTCOMB BOILER   |ELECTRIC GENERATN|BITUMINOUS COAL  |OTHER/NOT CLASIFD|TONS BURNED
1 01 003 01 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |>100MMBTU PULVWET|TONS BURNED
1 01 003 02 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |>100MMBTU PULVDRY|TONS BURNED
1 01 003 03 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |>100MMBTU CTCLONE|TONS BURNED
1 01 003 04 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |>100MMBTU OF STKR|TONS BURNED
1 01 003 05 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |>100MMBTU UF STKR|TONS BURNED
1 01 003 06 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |>100MMBTU SPDSTKR|TONS BURNED
1 01 003 07 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |10-100MMBTU DYPUL|TONS BURNED
1 01 003 08 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |10-100MMBTU WTPUL|TONS BURNED
1 01 003 09 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |10-100MMBTU OFSTK|TONS BURNED
1 01 003 10 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |10-100MMBTU UFSTK|TONS BURNED
1 01 003 11 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |10-100MMBTUSPDSTK|TONS BURNED
1 01 003 12 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |<10MMBTU PULV DRY|TONS BURNED
1 01 003 13 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |<10MMBTU OF STOKR|TONS BURNED
1 01 003 14 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |<10MMBTU UF STOKR|TONS BURNED
1 01 003 15 EXTCOMB BOILER   |ELECTRIC GENERATN|LIGNITE          |<10MMBTU SPDSTOKR|TONS BURNED
1 01 004 01 EXTCOMB BOILER   |ELECTRIC GENERATN|RESIDUAL OIL     |>100MMBTU/HR GENL|1000GALLONS BURNED
1 01 004 02 EXTCOMB BOILER   |ELECTRIC GENERATN|RESIDUAL OIL     |10-100MMBTU/HRGNL|1000GALLONS BURNED
1 01 004 03 EXTCOMB BOILER   |ELECTRIC GENERATN|RESIDUAL OIL     |<10MMBTU/HR GENL |1000GALLONS BURNED
1 01 005 01 EXTCOMB BOILER   |ELECTRIC GENERATN|DISTILLATE OIL   |>100MMBTU/HR GENL|1000GALLONS BURNED
1 01 005 02 EXTCOMB BOILER   |ELECTRIC GENERATN|DISTILLATE OIL   |10-100MMBTU/HRGNL|1000GALLONS BURNED
1 01 005 03 EXTCOMB BOILER   |ELECTRIC GENERATN|DISTILLATE OIL   |<10MMBTU/HR GENL |1000GALLONS BURNED
1 01 006 01 EXTCOMB BOILER   |ELECTRIC GENERATN|NATURAL GAS      |>100MMBTU/HR     |MILLION CUBIC FEET BURNED
1 01 006 02 EXTCOMB BOILER   |ELECTRIC GENERATN|NATURAL GAS      |10-100MMBTU/HR   |MILLION CUBIC FEET BURNED
1 01 006 03 EXTCOMB BOILER   |ELECTRIC GENERATN|NATURAL GAS      |<10MMBTU/HR      |MILLION CUBIC FEET BURNED
1 01 007 01 EXTCOMB BOILER   |ELECTRIC GENERATN|PROCESS GAS      |>100MMBTU/HR     |MILLION CUBIC FEET BURNED
1 01 007 02 EXTCOMB BOILER   |ELECTRIC GENERATN|PROCESS GAS      |10-100MMBTU/HR   |MILLION CUBIC FEET BURNED
1 01 007 03 EXTCOMB BOILER   |ELECTRIC GENERATN|PROCESS GAS      |<10MMBTU/HR      |MILLION CUBIC FEET BURNED
1 01 00- 01 EXTCOMB BOILER   |ELECTRIC GENERATN|COKE             |>100MMBTU/HR     |TONS BURNED
1 01 011 02 EXTCOMB BOILER   |ELECTRIC GENERATN|BAGASSE          |10-100MMBTU/HR   |TONS BURNED
1 01 011 03 EXTCOMB BOILER   |ELECTRIC GENERATN|BAGASSE          |<10MMBTU/HR      |TONS BURNED
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
  SCC ID                                  SCC CATEGORY NAMES
  ******                                  ******************
I II III IV        I                     II                III                IV                UNITS

1 01 012 01 EXTCOMB BOILER   |ELECTRIC GENERATN|SOLID WASTE/COAL |>100MMBTU/HR     |TONS BURNED
1 01 012 02 EXTCOMB BOILER   |ELECTRIC GENERATN|SOLID WASTE/COAL |10-100MMBTU/HR   |TONS BURNED
1 01 012 03 EXTCOMB BOILER   |ELECTRIC GENERATN|SOLID WASTE/COAL |<10MMBTU/HR      |TONS BURNED
1 01 999 97 EXTCOMB BOILER   |ELECTRIC GENERATN|OTHER/NOT CLASIFD|SPECIFY IN REMARK|MILLION CUBIC FEET BURNED
1 01 999 98 EXTCOMB BOILER   |ELECTRIC GENERATN|OTHER/NOT CLASIFD|SPECIFY IN REMARK|1000 GALLON (LIQUID) BURNED
1 01 999 99 EXTCOMB BOILER   |ELECTRIC GENERATN|OTHER NOT CLASIFD|SPECIFY IN REMARK|TONS BURNED (SOLID)
1 02 001 01 EXTCOMB BOILER   |INDUSTRIAL        |ANTHRACITE COAL  |>100MMBTU/HR PULV|TONS BURNED
1 02 001 02 EXTCOMB BOILER   |INDUSTRIAL        |ANTHRACITE COAL  |>100MMBTU/HR STKR|TONS BURNED
1 02 001 03 EXTCOMB BOILER   |INDUSTRIAL        |ANTHRACITE COAL  |10-100MMBTU PULVD|TONS BURNED
1 02 001 04 EXTCOMB BOILER   |INDUSTRIAL        |ANTHRACITE COAL  |10-100MMBTU STKR |TONS BURNED
1 02 001 05 EXTCOMB BOILER   |INDUSTRIAL        |ANTHRACITE COAL  |<10MMBTU/HR PULVD|TONS BURNED
1 02 001 06 EXTCOMB BOILER   |INDUSTRIAL        |ANTHRACITE COAL  |<10MMBTU/HR STKR |TONS BURNED
1 02 001 07 EXTCOMB BOILER   |INDUSTRIAL        |ANTHRACITE COAL  |<10MMBTU/HR HNDFR|TONS BURNED
1 02 001 99 EXTCOMB BOILER   |INDUSTRIAL        |ANTHRACITE COAL  |OTHER/NOT CLASIFD|TONS BURNED
1 02 002 01 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |>100MMBTU PULVWET|TONS BURNED
1 02 002 02 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |>100MMBTU PULVDRY|TONS BURNED
1 02 002 03 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |>100MMBTU CYCLONE|TONS BURNED
1 02 002 04 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |>100MMBTU SPDSTKR|TONS BURNED
1 02 002 05 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |10-100MMBTU OFSTK|TONS BURNED
1 02 002 06 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |10-100MMBTU UFSTK|TONS BURNED
1 02 002 07 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |10-100MMBTU PULWT|TONS BURNED
1 02 002 08 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |10-100MMBTU PULDY|TONS BURNED
1 02 002 09 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |10-100MMBTUSPDSTK|TONS BURNED
1 02 002 10 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |<10MMBTU OFD STKR|TONS BURNED
1 02 002 11 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |<10MMBTU UFD STKR|TONS BURNED
1 02 002 12 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |<10MMBTU PULV DRY|TONS BURNED
1 02 002 13 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |<10MMBTU SPD STKR|TONS BURNED
1 02 002 14 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |<10MMBTU HANDFIRE|TONS BURNED
1 02 002 99 EXTCOMB BOILER   |INDUSTRIAL        |BITUMINOUS COAL  |OTHER/NOT CLASIFD|TONS BURNED
1 02 003 01 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |>100MMBTU PULVWET|TONS BURNED
1 02 003 02 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |>100MMBTU PULVDRY|TONS BURNED
1 02 003 03 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |>100MMBTU CYCLONE|TONS BURNED
1 02 003 04 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |>100MMBTU OFSTKR |TONS BURNED
1 02 003 05 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |>100MMBTU UFSTKR |TONS BURNED
1 02 003 06 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |>100MMBTU SPDSTKR|TONS BURNED
1 02 003 07 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |10-100MMBTU DYPUL|TONS BURNED
1 02 003 08 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |10-100MMBTU WTPUL|TONS BURNED
1 02 003 09 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |10-100MMBTU OFSTK|TONS BURNED
1 02 003 10 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |10-100MMBTU UFSTK|TONS BURNED
1 02 003 11 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |10-100MMBTUSPDSTK|TONS BURNED
1 02 003 12 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |<10MMBTU PULV DRY|TONS BURNED
1 02 003 13 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |<10MMBTU OFSTOKR |TONS BURNED
1 02 003 14 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |<10MMBTU UFSTOKR |TONS BURNED
1 02 003 15 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |<10MMBTU HANDFIRE|TONS BURNED
1 02 003 16 EXTCOMB BOILER   |INDUSTRIAL        |LIGNITE          |<10MMBTU SPDSTKR |TONS BURNED
1 02 004 01 EXTCOMB BOILER   |INDUSTRIAL        |RESIDUAL OIL     |>100MMBTU/HR     |1000 GALLONS BURNED
1 02 004 02 EXTCOMB BOILER   |INDUSTRIAL        |RESIDUAL OIL     |10-100MMBTU/HR   |1000 GALLONS BURNED
1 02 004 03 EXTCOMB BOILER   |INDUSTRIAL        |RESIDUAL OIL     |<10MMBTU/HR      |1000 GALLONS BURNED
1 02 005 01 EXTCOMB BOILER   |INDUSTRIAL        |DISTILLATE OIL   |>100MMBTU/HR     |1000 GALLONS BURNED
1 02 005 02 EXTCOMB BOILER   |INDUSTRIAL        |DISTILLATE OIL   |10-100MMBTU/HR   |1000 GALLONS BURNED
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
  SCC ID                                        SCC CATEGORY NAMES
  ******                                        ******************
I II III IV         I                  II                 III                IV                    UNITS

1 02 005 03 EXTCOMB BOILER    |INDUSTRIAL        |DISTILLATE OIL    |<10MMBTU/HR       |1000 GALLONS BURNED
1 02 006 01 EXTCOMB BOILER    |INDUSTRIAL        |NATURAL GAS       |>100MMBTU/HR      |MILLION CUBIC FEET BURNED
1 02 006 02 EXTCOMB BOILER    |INDUSTRIAL        |NATURAL GAS       |10-100MMBTU/HR    |MILLION CUBIC FEET BURNED
1 02 006 03 EXTCOMB BOILER    |INDUSTRIAL        |NATURAL GAS       |<10MMBTU/HR       |MILLION CUBIC FEET BURNED
1 02 007 01 EXTCOMB BOILER    |INDUSTRIAL        |PROCESS GAS       |>100MMBTU/HR      |MILLION CUBIC FEET BURNED
1 02 007 02 EXTCOMB BOILER    |INDUSTRIAL        |PROCESS GAS       |10-100MMBTU/HR    |MILLION CUBIC FEET BURNED
1 02 007 03 EXTCOMB BOILER    |INDUSTRIAL        |PROCESS GAS       |<10MMBTU/HR       |MILLION CUBIC FEET BURNED
1 02 008 02 EXTCOMB BOILER    |INDUSTRIAL        |COKE              |10-100MMBTU/HR    |TONS BURNED
1 02 008 03 EXTCOMB BOILER    |INDUSTRIAL        |COKE              |<10MMBTU/HR       |TONS BURNED
1 02 009 02 EXTCOMB BOILER    |INDUSTRIAL        |WOOD              |WOOD WASTE BOILER|TONS BURNED
1 02 009 03 EXTCOMB BOILER    |INDUSTRIAL        |WOOD              |SMALL HANDFIRE    |TONS BURNED
1 02 010 02 EXTCOMB BOILER    |INDUSTRIAL        |LIQ PETROLEUM GAS|10-100MMBTU/HR    |1000GALLONS BURNED
1 02 010 03 EXTCOMB BOILER    |INDUSTRIAL        |LIQ PETROLEUM GAS|<10MMBTU/HR       |1000GALLONS BURNED
1 02 011 02 EXTCOMB BOILER    |INDUSTRIAL        |BAGASSE           |10-100MMBTU/HR    |TONS BURNED
1 02 011 03 EXTCOMB BOILER    |INDUSTRIAL        |BAGASSE           |<10MMBTU/HR       |TONS BURNED
1 02 999 97 EXTCOMB BOILER    |INDUSTRIAL        |OTHER/NOT CLASIFD|SPECIFY IN REMARK|MILLION CUBIC FEET BURNED
1 02 999 98 EXTCOMB BOILER    |INDUSTRIAL        |OTHER/NOT CLASIFD|SPECIFY IN REMARK|1000 GALLON BURNED (LIQUID)
1 02 999 99 EXTCOMB BOILER    |INDUSTRIAL        |OTHER NOT CLASIFD|SPECIFY IN REMARK|TONS BURNED (SOLID)
1 03 001 05 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL   |10-100MMBTU PULWT|TONS BURNED
1 03 001 06 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL   |10-100MMBTU PULDY|TONS BURNED
1 03 001 07 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL   |10-100MMBTUSPDSTK|TONS BURNED
1 03 001 08 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL   |<10MMBTU PULVIZED|TONS BURNED
1 03 001 09 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL   |<10MMBTU STOKER   |TONS BURNED
1 03 001 10 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL   |<10MMBTU SPDSTOKR|TONS BURNED
1 03 001 99 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL   |OTHER/NOT CLASIFD|TONS BURNED
1 03 002 05 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL   |10-100MMBTU PULWT|TONS BURNED
1 03 002 06 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL   |10-100MMBTU PULDY|TONS BURNED
1 03 002 07 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL   |10-100MMBTU OFSTK|TONS BURNED
1 03 002 08 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL   |10-100MMBTU UFSTK|TONS BURNED
1 03 002 09 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL   |10-100MMBTUSPDSTK|TONS BURNED
1 03 002 10 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL   |10-100MMBTU HANFR|TONS BURNED
1 03 002 11 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL   |<10MMBTU OFSTOKER|TONS BURNED
1 03 002 12 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL   |<10MMBTU UFSTOKER|TONS BURNED
1 03 002 13 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL   |<10MMBTU SPDSTOKR|TONS BURNED
1 03 002 14 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL   |<10MMBTU HANDFIRE|TONS BURNED
1 03 002 99 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL   |OTHER/NOT CLASIFD|TONS BURNED
1 03 003 05 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE           |10-100MMBTU PULWT|TONS BURNED
1 03 003 06 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE           |10-100MMBTU PULDY|TONS BURNED
1 03 003 07 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE           |10-100MMBTU OFSTK|TONS BURNED
1 03 003 08 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE           |10-100MMBTU UFSTK|TONS BURNED
1 03 003 09 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE           |10-100MMBTUSPDSTK|TONS BURNED
1 03 003 10 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE           |<10MMBTU PULV-DRY|TONS BURNED
1 03 003 11 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE           |<10MMBTU OFSTOKER|TONS BURNED
1 03 003 12 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE           |<10MMBTU UFSTOKER|TONS BURNED
1 03 003 13 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE           |<10MMBTU SPDSTOKR|TONS BURNED
1 03 003 14 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE           |<10MMBTU HANDFIRE|TONS BURNED
1 03 004 01 EXTCOMB BOILER    |COMMERCL-INSTUTNL|RESIDUAL OIL      |>100MMBTU/HR      |1000 GALLONS BURNED
1 03 004 02 EXTCOMB BOILER    |COMMERCL-INSTUTNL|RESIDUAL OIL      |10-100MMBTU/HR    |1000 GALLONS BURNED
1 03 004 03 EXTCOMB BOILER    |COMMERCL-INSTUTNL|RESIDUAL OIL      |<10MMBTU/HR       |1000 GALLONS BURNED
1 03 005 01 EXTCOMB BOILER    |COMMERCL-INSTUTNL|DISTILLATE        |>100MMBTU/HR      |1000 GALLONS BURNED
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
  SCC ID                                SCC CATEGORY NAMES
  ******                               ******************
I II III IV          I                  II                III               IV                    UNITS

1 03 005 02 EXTCOMB BOILER    |COMMERCL-INSTUTNL|DISTILLATE        |10-100MMBTU/HR    |1000 GALLONS BURNED
1 03 005 03 EXTCOMB BOILER    |COMMERCL-INSTUTNL|DISTILLATE        |<10MMBTU/HR       |1000 GALLONS BURNED
1 03 006 01 EXTCOMB BOILER    |COMMERCL-INSTUTNL|NATURAL GAS       |>100MMBTU/HR      |MILLION CUBIC FEET BURNED
1 03 006 02 EXTCOMB BOILER    |COMMERCL-INSTUTNL|NATURAL GAS       |10-100MMBTU/HR    |MILLION CUBIC FEET BURNED
1 03 006 03 EXTCOMB BOILER    |COMMERCL-INSTUTNL|NATURAL GAS       |<10MMBTU/HR       |MILLION CUBIC FEET BURNED
1 03 009 03 EXTCOMB BOILER    |COMMERCL-INSTUTNL|WOOD              |<10MMBTU/HR       |TONS BURNED
1 03 010 02 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIQ PETROLEUM GAS|10-100MMBTU/HR    |1000 GALLONS BURNED
1 03 010 03 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIQ PETROLEUM GAS|<10MMBTU/HR       |1000 GALLONS BURNED
1 03 999 97 EXTCOMB BOILER    |COMMERCL-INSTUTNL|OTHER/NOT CLASIFD|SPECIFY IN REMARK|MILLION CUBIC FEET BURNED
1 03 999 98 EXTCOMB BOILER    |COMMERCL-INSTUTNL|OTHER/NOT CLASIFD|SPECIFY IN REMARK|1000 GALLON BURNED (LIQUID)
1 03 999 99 EXTCOMB BOILER    |COMMERCL-INSTUTNL|OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS BURNED (SOLID)
2 01 001 01 INTERNLCOMBUSTION|ELECTRIC GENERATN|DISTILLATE OIL    |TURBINE           |1000 GALLONS BURNED
2 01 002 01 INTERNLCOMBUSTION|ELECTRIC GENERATN|NATURAL GAS       |TURBINE           |MILLION CUBIC FEET
2 01 003 01 INTERNLCOMBUSTION|ELECTRIC GENERATN|DIESEL            |RECIPROCATING     |THOUSANDS OF GALLONS
2 01 999 97 INTERNLCOMBUSTION|ELECTRIC GENERATN|OTHER/NOT CLASIFD|SPECIFY IN REMARK|MILLION CUBIC FEET BURNED
2 01 999 98 INTERNLCOMBUSTION|ELECTRIC GENERATN|OTHER/NOT CLASIFD|SPECIFY IN REMARK|1000 GALLONS BURNED
2 02 001 01 INTERNLCOMBUSTION|INDUSTRIAL        |DISTILLATE OIL    |TURBINE           |1000 GALLONS BURNED
2 02 001 02 INTERNLCOMBUSTION|INDUSTRIAL        |DISTILLATE OIL    |RECIPROCATING     |1000 GALLONS BURNED
2 02 002 01 INTERNLCOMBUSTION|INDUSTRIAL        |NATURAL GAS       |TURBINE           |MILLION CUBIC FEET
2 02 002 02 INTERNLCOMBUSTION|INDUSTRIAL        |NATURAL GAS       |RECIPROCATING     |MILLION CUBIC FEET
2 02 003 01 INTERNLCOMBUSTION|INDUSTRIAL        |GASOLINE          |RECIPROCATING     |1000 GALLONS BURNED
2 02 004 01 INTERNLCOMBUSTION|INDUSTRIAL        |DIESEL FUEL       |RECIPROCATING     |1000 GALLONS BURNED
2 02 999 97 INTERNLCOMBUSTION|INDUSTRIAL        |OTHER/NOT CLASIFD|SPECIFY IN REMARK|MILLION CUBIC FEET BURNED
2 02 999 98 INTERNLCOMBUSTION|INDUSTRIAL        |OTHER/NOT CLASIFD|SPECIFY IN REMARK|1000 GALLONS BURNED
2 03 001 01 INTERNLCOMBUSTION|COMMERCL-INSTUTNL|DIESEL            |RECIPROCATING     |THOUSANDS OF GALLONS
2 03 999 97 INTERNLCOMBUSTION|COMMERCL-INSTUTNL|OTHER/NOT CLASIFD|SPECIFY IN REMARK|MILLION CUBIC FEET BURNED
2 03 999 98 INTERNLCOMBUSTION|COMMERCL-INSTUTNL|OTHER/NOT CLASIFD|SPECIFY IN REMARK|1000 GALLONS BURNED
2 04 001 01 INTERNLCOMBUSTION|ENGINE TESTING    |AIRCRAFT          |TURBOJET          |THOUSANDS OF GALLON/FUEL
3 01 001 01 INDUSTRIAL PROCES|CHEMICAL MFG      |ADIPIC ACID PROD  |GENERAL-CYCLO-EX  |TONS PRODUCED
3 01 001 99 INDUSTRIAL PROCES|CHEMICAL MFG      |ADIPIC ACID PROD  |OTHER/NOT CLASIFD|TONS PRODUCED
3 01 002 01 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIA W/METHNTR|PURGE GAS         |TONS PRODUCED
3 01 002 02 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIA W/METHNTR|STORAGE/LOADING   |TONS PRODUCED
3 01 003 01 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIA W/COABSRB|REGENERATOR EXIT  |TONS PRODUCED
3 01 003 02 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIA W/COABSRB|PURGE GAS         |TONS PRODUCED
3 01 003 03 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIA W/COABSRB|STORAGE/LOADING   |TONS PRODUCED
3 01 003 99 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIA           |OTHER/NOT CLASIFD|TONS PRODUCED
3 01 004 01 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIUM NITRATE  |GENERAL           |TONS PRODUCED
3 01 004 99 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIUM NITRATE  |OTHER/NOT CLASIFD|TONS PRODUCED
3 01 005 01 INDUSTRIAL PROCES|CHEMICAL MFG      |CARBON BLACK      |CHANNEL PROCESS   |TONS PRODUCED
3 01 005 02 INDUSTRIAL PROCES|CHEMICAL MFG      |CARBON BLACK      |THERMAL PROCESS   |TONS PRODUCED
3 01 005 03 INDUSTRIAL PROCES|CHEMICAL MFG      |CARBON BLACK      |FURNACE PROC GAS  |TONS PRODUCED
3 01 005 04 INDUSTRIAL PROCES|CHEMICAL MFG      |CARBON BLACK      |FURNACE PROC OIL  |TONS PRODUCED
3 01 005 05 INDUSTRIAL PROCES|CHEMICAL MFG      |CARBON BLACK      |FURNACE W/GAS/OIL|TONS PRODUCED
3 01 005 99 INDUSTRIAL PROCES|CHEMICAL MFG      |CARBON BLACK      |OTHER/NOT CLASFD  |TONS PRODUCT
3 01 006 01 INDUSTRIAL PROCES|CHEMICAL MFG      |CHARCOAL MFG      |PYROL/DISTIL/GENL|TONS PRODUCED
3 01 006 99 INDUSTRIAL PROCES|CHEMICAL MFG      |CHARCOAL MFG      |OTHER/NOT CLASFD  |TONS PRODUCT
3 01 007 01 INDUSTRIAL PROCES|CHEMICAL MFG      |CHLORINE          |GENERAL           |TONS PRODUCED
3 01 007 99 INDUSTRIAL PROCES|CHEMICAL MFG      |CHLORINE          |OTHER/NOT CLASIFD|TONS PRODUCED
3 01 008 01 INDUSTRIAL PROCES|CHEMICAL MFG      |CHLOR-ALKALI      |LIQUIFTN-DIAPHRGM|100 TONS CHLORINE LIQUEFIED
3 01 008 02 INDUSTRIAL PROCES|CHEMICAL MFG      |CHLOR-ALKALI      |LIQUIFTN-MERC CEL|100 TONS CHLORINE LIQUEFIED
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

SCC ID I	II	III	IV	SCC CATEGORY NAMES I	II	III	IV	UNITS
3	01	008	03	INDUSTRIAL PROCES	CHEMICAL MFG	CHLOR-ALKALI	LOADING TNKCARVNT	100 TONS CHLORINE LIQUEFIED
3	01	008	04	INDUSTRIAL PROCES	CHEMICAL MFG	CHLOR-ALKALI	LOADING STGTNKVNT	100 TONS CHLORINE LIQUEFIED
3	01	008	05	INDUSTRIAL PROCES	CHEMICAL MFG	CHLOR-ALKALI	AIR-BLOW MC BRINE	100 TONS CHLORINE LIQUEFIED
3	01	008	99	INDUSTRIAL PROCES	CHEMICAL MFG	CHLOR-ALKALI	OTHER/NOT CLASIFD	100 TONS CHLORINE LIQUEFIED
3	01	009	01	INDUSTRIAL PROCES	CHEMICAL MFG	CLEANING CHEMICLS	SOAP/DET SPRYDRYR	TONS PRODUCED
3	01	009	10	INDUSTRIAL PROCES	CHEMICAL MFG	CLEANING CHEMICLS	SPECIALTY CLEANRS	TONS PRODUCT
3	01	009	99	INDUSTRIAL PROCES	CHEMICAL MFG	CLEANING CHEMICLS	OTHERS/NOT CLASFD	TONS PRODUCED
3	01	010	01	INDUSTRIAL PROCES	CHEMICAL MFG	EXPLOSIVES-TNT	NITRATION REACTRS	TONS PRODUCED
3	01	010	02	INDUSTRIAL PROCES	CHEMICAL MFG	EXPLOSIVES-TNT	HNO3 CONCTRTRS	TONS PRODUCED
3	01	010	03	INDUSTRIAL PROCES	CHEMICAL MFG	EXPLOSIVES-TNT	H2SO4 REGENERATR	TONS PRODUCED
3	01	010	04	INDUSTRIAL PROCES	CHEMICAL MFG	EXPLOSIVES-TNT	RED WATER INCIN	TONS PRODUCED
3	01	010	05	INDUSTRIAL PROCES	CHEMICAL MFG	EXPLOSIVES-TNT	OPEN WASTE BURN	TONS BURNED
3	01	010	99	INDUSTRIAL PROCES	CHEMICAL MFG	EXPLOSIVES	OTHER/NOT CLASIFD	TONS PRODUCED
3	01	011	01	INDUSTRIAL PROCES	CHEMICAL MFG	HYDROCHLORIC ACID	BYPRODUCTW/OSCRUB	TONS FINAL ACID
3	01	011	02	INDUSTRIAL PROCES	CHEMICAL MFG	HYDROCHLORIC ACID	BYPRODUCT W/SCRUB	TONS FINAL ACID
3	01	011	99	INDUSTRIAL PROCES	CHEMICAL MFG	HYDROCHLORIC ACID	OTHER/NOT CLASIFD	TONS FINAL ACID
3	01	012	01	INDUSTRIAL PROCES	CHEMICAL MFG	HYDROFLUORIC ACID	ROTRYKILNW/SCRUBR	TONS ACID
3	01	012	02	INDUSTRIAL PROCES	CHEMICAL MFG	HYDROFLUORIC ACID	ROTRYKILNW/OSCRUB	TONS ACID
3	01	012	03	INDUSTRIAL PROCES	CHEMICAL MFG	HYDROFLUORIC ACID	GRIND/DRY FLUOSPR	TONS FLUORSPAR
3	01	012	99	INDUSTRIAL PROCES	CHEMICAL MFG	HYDROFLUORIC ACID	OTHER/NOT CLASIFD	TONS ACID
3	01	013	01	INDUSTRIAL PROCES	CHEMICAL MFG	NITRIC ACID	AMMONIAOXIDATNOLD	TONS PURE ACID PRODUCED
3	01	013	02	INDUSTRIAL PROCES	CHEMICAL MFG	NITRIC ACID	AMMONIAOXIDATNNEW	TONS PURE ACID PRODUCED
3	01	013	03	INDUSTRIAL PROCES	CHEMICAL MFG	NITRIC ACID	NITACD CONCTR OLD	TONS PURE ACID PRODUCED
3	01	013	04	INDUSTRIAL PROCES	CHEMICAL MFG	NITRIC ACID	NITACD CONCTR NEW	TONS PURE ACID PRODUCED
3	01	013	05	INDUSTRIAL PROCES	CHEMICAL MFG	NITRIC ACID-WEAK	UNCONTROLLED	TONS PURE ACID PRODUCED
3	01	013	06	INDUSTRIAL PROCES	CHEMICAL MFG	NITRIC ACID-WEAK	W/CATYL/COMBUSTER	TONS PURE ACID PRODUCED
3	01	013	07	INDUSTRIAL PROCES	CHEMICAL MFG	NITRIC ACID-STRNG	UNCONTROLLED	TONS PURE ACID PRODUCED
3	01	013	08	INDUSTRIAL PROCES	CHEMICAL MFG	NITRIC ACID-STRNG	W/ABSORBERS	TONS PURE ACID PRODUCED
3	01	013	99	INDUSTRIAL PROCES	CHEMICAL MFG	NITRIC ACID	OTHER/NOT CLASIFD	TONS PURE ACID PRODUCED
3	01	014	01	INDUSTRIAL PROCES	CHEMICAL MFG	PAINT MFG	GENERAL	TONS PRODUCED
3	01	014	02	INDUSTRIAL PROCES	CHEMICAL MFG	PAINT MFG	PIGMENT KILN	TONS PRODUCT
3	01	014	99	INDUSTRIAL PROCES	CHEMICAL MFG	PAINT MFG	OTHER/NOT CLASFD	TONS PRODUCT
3	01	015	01	INDUSTRIAL PROCES	CHEMICAL MFG	VARNISH MFG	BODYING OIL GENL	TONS PRODUCED
3	01	015	02	INDUSTRIAL PROCES	CHEMICAL MFG	VARNISH MFG	OLEORESINOUS GENL	TONS PRODUCED
3	01	015	03	INDUSTRIAL PROCES	CHEMICAL MFG	VARNISH MFG	ALKYD GENERAL	TONS PRODUCED
3	01	015	05	INDUSTRIAL PROCES	CHEMICAL MFG	VARNISH MFG	ACRYLIC GENERAL	TONS PRODUCED
3	01	015	99	INDUSTRIAL PROCES	CHEMICAL MFG	VARNISH MFG	OTHER/NOT CLASFD	TONS PRODUCED
3	01	016	01	INDUSTRIAL PROCES	CHEMICAL MFG	PHOS-ACID WETPROC	REACTOR-UNCONTLD	TONS PHOSPHATE ROCK
3	01	016	02	INDUSTRIAL PROCES	CHEMICAL MFG	PHOS-ACID WETPROC	GYPSUM POND	TONS PHOSPHATE ROCK
3	01	016	03	INDUSTRIAL PROCES	CHEMICAL MFG	PHOS-ACID WETPROC	CONDENSR-UNCONTLD	TONS PHOSPHATE ROCK
3	01	016	99	INDUSTRIAL PROCES	CHEMICAL MFG	PHOS-ACID WETPROC	OTHER/NOT CLASFD	TONS PRODUCED
3	01	017	01	INDUSTRIAL PROCES	CHEMICAL MFG	PHOS-ACID THERMAL	GENERAL	TONS PHOSPHOROUS BURNED
3	01	017	99	INDUSTRIAL PROCES	CHEMICAL MFG	PHOS-ACID THERMAL	OTHER/NOT CLASFD	TONS PRODUCED
3	01	018	01	INDUSTRIAL PROCES	CHEMICAL MFG	PLASTICS	PVC-GENERAL	TONS PRODUCED
3	01	018	02	INDUSTRIAL PROCES	CHEMICAL MFG	PLASTICS	POLYPROD-GENERAL	TONS PRODUCED
3	01	018	05	INDUSTRIAL PROCES	CHEMICAL MFG	PLASTICS	BAKELITE-GENERAL	TONS PRODUCT
3	01	018	99	INDUSTRIAL PROCES	CHEMICAL MFG	PLASTICS	OTHER/NOT CLASFD	TONS PRODUCED
3	01	019	03	INDUSTRIAL PROCES	CHEMICAL MFG	PHTHALIC ANHYDRID	UNCONTROLLED-GENL	TONS PRODUCED
3	01	020	01	INDUSTRIAL PROCES	CHEMICAL MFG	PRINTING INK	COOKING-GENERAL	TONS PRODUCED
3	01	020	02	INDUSTRIAL PROCES	CHEMICAL MFG	PRINTING INK	COOKING-OILS	TONS PRODUCED

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
  SCC ID                                  SCC CATEGORY NAMES
  ******                                  ******************
I II III IV        I                II                   III                 IV                   UNITS

3 01 020 03 INDUSTRIAL PROCES|CHEMICAL MFG     |PRINTING INK     |COOKING-OLEORESIN|TONS PRODUCED
3 01 020 04 INDUSTRIAL PROCES|CHEMICAL MFG     |PRINTING INK     |COOKING-ALKYDS   |TONS PRODUCED
3 01 020 05 INDUSTRIAL PROCES|CHEMICAL MFG     |PRINTING INK     |PIGMENT MIXINGGEN|TONS PIGMENT
3 01 020 99 INDUSTRIAL PROCES|CHEMICAL MFG     |PRINTING INK     |OTHER/NOT CLASFD |TONS PRODUCED
3 01 021 01 INDUSTRIAL PROCES|CHEMICAL MFG     |SODIUM CARBONATE |AMMONIA RECOVERY |TONS PRODUCED
3 01 021 02 INDUSTRIAL PROCES|CHEMICAL MFG     |SODIUM CARBONATE |HANDLING         |TONS PRODUCED
3 01 021 99 INDUSTRIAL PROCES|CHEMICAL MFG     |SODIUM CARBONATE |OTHER/NOT CLASFD |TONS PRODUCED
3 01 022 01 INDUSTRIAL PROCES|CHEMICAL MFG     |H2SO4 -CHAMBER   |GENERAL          |TONS PURE ACID PRODUCED
3 01 023 01 INDUSTRIAL PROCES|CHEMICAL MFG     |H2SO4-CONTACT    |99.7 CONVERSION  |TONS PURE ACID PRODUCED
3 01 023 04 INDUSTRIAL PROCES|CHEMICAL MFG     |H2SO4-CONTACT    |99.5 CONVERSION  |TONS PURE ACID PRODUCED
3 01 023 06 INDUSTRIAL PROCES|CHEMICAL MFG     |H2SO4-CONTACT    |99.3 CONVERSION  |TONS PURE ACID PRODUCED
3 01 023 08 INDUSTRIAL PROCES|CHEMICAL MFG     |H2SO4-CONTACT    |99.0 CONVERSION  |TONS PURE ACID PRODUCED
3 01 023 10 INDUSTRIAL PROCES|CHEMICAL MFG     |H2SO4-CONTACT    |97.0 CONVERSION  |TONS PURE ACID PRODUCED
3 01 023 12 INDUSTRIAL PROCES|CHEMICAL MFG     |H2SO4-CONTACT    |96.0 CONVERSION  |TONS PURE ACID PRODUCED
3 01 023 14 INDUSTRIAL PROCES|CHEMICAL MFG     |H2SO4-CONTACT    |95.0 CONVERSION  |TONS PURE ACID PRODUCED
3 01 023 16 INDUSTRIAL PROCES|CHEMICAL MFG     |H2SO4-CONTACT    |94.0 CONVERSION  |TONS PURE ACID PRODUCED
3 01 023 18 INDUSTRIAL PROCES|CHEMICAL MFG     |H2SO4-CONTACT    |93.0 CONVERSION  |TONS PURE ACID PRODUCED
3 01 023 99 INDUSTRIAL PROCES|CHEMICAL MFG     |H2SO4-CONTACT    |OTHER/NOT CLASFD |TONS PRODUCED
3 01 024 01 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC FIBERS |NYLON GENERAL    |TONS FIBER
3 01 024 02 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC FIBERS |DACRON GENERAL   |TONS FIBER
3 01 024 03 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC FIBERS |ORLON            |TONS PRODUCT
3 01 024 04 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC FIBERS |ELASTIC          |TONS PRODUCT
3 01 024 05 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC FIBERS |TEFLON           |TONS PRODUCT
3 01 024 06 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC FIBERS |POLYESTER        |TONS PRODUCT
3 01 024 08 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC FIBERS |NOMEX            |TONS PRODUCT
3 01 024 10 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC FIBERS |ACRYLIC          |TONS PRODUCT
3 01 024 12 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC FIBERS |TYVEX            |TONS PRODUCT
3 01 024 14 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC FIBERS |OLEFINS          |TONS PRODUCT
3 01 024 99 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC FIBERS |OTHERS/NOT CLASFD|TONS PRODUCED
3 01 025 01 INDUSTRIAL PROCES|CHEMICAL MFG     |SEMISYNTHTICFIBR |RAYON  GENERAL   |TONS FIBER
3 01 025 05 INDUSTRIAL PROCES|CHEMICAL MFG     |SEMISYNTHTICFIBR |ACETATE          |TONS PRODUCED
3 01 025 10 INDUSTRIAL PROCES|CHEMICAL MFG     |SEMISYNTHETICFIBR|VISCOSE          |TONS PRODUCED
3 01 025 99 INDUSTRIAL PROCES|CHEMICAL MFG     |SEMISYNTHTICFIBR |OTHERS/NOT CLASFD|TONS PRODUCED
3 01 026 01 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC RUBBER |BUTADIENE-GENERAL|TONS PRODUCT
3 01 026 02 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC RUBBER |METHYLPROPENE-GNL|TONS PRODUCT
3 01 026 03 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC RUBBER |BUTYNE GENERAL   |TONS PRODUCT
3 01 026 04 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC RUBBER |PENTADIENE-GENRL |TONS PRODUCT
3 01 026 05 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC RUBBER |DIMETHHEPTNE GENL|TONS PRODUCT
3 01 026 06 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC RUBBER |PENTANE-GENERAL  |TONS PRODUCT
3 01 026 07 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC RUBBER |ETHANENITRILE-GEN|TONS PRODUCT
3 01 026 08 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC RUBBER |ACRYLONITRILE-GEN|TONS PRODUCT
3 01 026 09 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC RUBBER |ACROLEIN-GENERAL |TONS PRODUCT
3 01 026 20 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC RUBBER |AUTO TIRES GENERL|TONS PRODUCT
3 01 026 99 INDUSTRIAL PROCES|CHEMICAL MFG     |SYNTHETIC RUBBER |OTHER/NOT CLASFD |TONS PRODUCT
3 01 027 01 INDUSTRIAL PROCES|CHEMICAL MFG     |FERTILIZ AMONNITR|PRILTWR-NEUTRLIZR|TONS PRODUCED
3 01 027 02 INDUSTRIAL PROCES|CHEMICAL MFG     |FERTILIZ AMONNITR|PRILLING TOWER   |TONS PRODUCED
3 01 027 03 INDUSTRIAL PROCES|CHEMICAL MFG     |FERTILIZ AMONNITR|PRILTWR-DRYCOOLRS|TONS PRODUCED
3 01 027 04 INDUSTRIAL PROCES|CHEMICAL MFG     |FERTILIZ AMONNITR|GRANULAT-NEUTLIZR|TONS PRODUCED
3 01 027 05 INDUSTRIAL PROCES|CHEMICAL MFG     |FERTILIZ AMONNITR|GRANULATOR       |TONS PRODUCED
3 01 027 06 INDUSTRIAL PROCES|CHEMICAL MFG     |FERTILIZ AMONNITR|GRANULAT-DRYCOOLR|TONS PRODUCED
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
  SCC ID                                    SCC CATEGORY NAMES
  ******                                    ******************
I II III IV        I                  II                   III                IV              UNITS

3 01 028 01 INDUSTRIAL PROCES|CHEMICAL MFG      |FERTILIZ-NSUPPHOS|GRIND-DRY        |TONS PRODUCED
3 01 028 02 INDUSTRIAL PROCES|CHEMICAL MFG      |FERTILIZ-NSUPPHOS|MAIN STACK       |TONS PRODUCED
3 01 029 01 INDUSTRIAL PROCES|CHEMICAL MFG      |FERTILIZ-TRPSPHOS|RUN OF PILE      |TONS PRODUCED
3 01 029 02 INDUSTRIAL PROCES|CHEMICAL MFG      |FERTILIZ-TRPSPHOS|GRANULAR         |TONS PRODUCED
3 01 030 01 INDUSTRIAL PROCES|CHEMICAL MFG      |FERTILIZ-DIAMPHOS|DRYER-COOLERS    |TONS PRODUCED
3 01 030 02 INDUSTRIAL PROCES|CHEMICAL MFG      |FERTILIZ-DIAMPHOS|AMONIAT-GRANULATE|TONS PRODUCED
3 01 030 99 INDUSTRIAL PROCES|CHEMICAL MFG      |FERTILIZER       |OTHER/NOT CLASIFD|TONS PRODUCED
3 01 031 01 INDUSTRIAL PROCES|CHEMICAL MFG      |TEREPTHALIC ACID |HNO3-PARAXYLENGEN|TONS PRODUCED
3 01 031 99 INDUSTRIAL PROCES|CHEMICAL MFG      |TEREPTHALIC ACID |OTHER/NOT CLASIFD|TONS PRODUCED
3 01 032 01 INDUSTRIAL PROCES|CHEMICAL MFG      |SULFUR(ELEMENTAL)|MOD-CLAUS 2STAGE |TONS PRODUCT
3 01 032 02 INDUSTRIAL PROCES|CHEMICAL MFG      |SULFUR(ELEMENTAL)|MOD-CLAUS 3STAGE |TONS PRODUCT
3 01 032 03 INDUSTRIAL PROCES|CHEMICAL MFG      |SULFUR(ELEMENTAL)|MOD-CLAUS 4STAGE |TONS PRODUCT
3 01 032 99 INDUSTRIAL PROCES|CHEMICAL MFG      |SULFUR(ELEMENTAL)|OTHER/NOT CLASIFD|TONS PRODUCT
3 01 033 01 INDUSTRIAL PROCES|CHEMICAL MFG      |PESTICIDES       |MALATHION        |GALLONS OF PRODUCT
3 01 033 99 INDUSTRIAL PROCES|CHEMICAL MFG      |PESTICIDES       |OTHER/NOT CLASIFD|TONS PRODUCED
3 01 034 01 INDUSTRIAL PROCES|CHEMICAL MFG      |AMINES/AMIDES    |GENERAL/OTHER    |TONS PRODUCT
3 01 035 01 INDUSTRIAL PROCES|CHEMICAL MFG      |PIGMENT-INORGAN  |CALCINATION      |TONS OF PRODUCT
3 01 035 99 INDUSTRIAL PROCES|CHEMICAL MFG      |PIGMENT-INORGAN  |OTHER/NOT CLASIFD|TONS OF PRODUCT
3 01 036 01 INDUSTRIAL PROCES|CHEMICAL MFG      |SODIUM SULFATE   |GENERAL/OTHER    |TONS PRODUCT
3 01 036 02 INDUSTRIAL PROCES|CHEMICAL MFG      |SODIUM SULFATE   |KILNS            |TONS PRODUCT
3 01 037 01 INDUSTRIAL PROCES|CHEMICAL MFG      |SODIUM SULFITE   |GENERAL/OTHER    |TONS PRODUCT
3 01 037 02 INDUSTRIAL PROCES|CHEMICAL MFG      |SODIUM SULFITE   |KILNS            |TONS PRODUCT
3 01 038 01 INDUSTRIAL PROCES|CHEMICAL MFG      |SODIUM BICARB    |GENERAL          |TONS PRODUCT
3 01 039 01 INDUSTRIAL PROCES|CHEMICAL MFG      |LITHIUM HYDROXIDE|GENERAL          |TONS PRODUCT
3 01 040 01 INDUSTRIAL PROCES|CHEMICAL MFG      |FERTILIZER UREA  |GENERAL          |TONS PRODUCT
3 01 050 01 INDUSTRIAL PROCES|CHEMICAL MFG      |ADHESIVES        |GENL/COMPND UNKWN|TONS PRODUCT
3 01 090 99 INDUSTRIAL PROCES|CHEMICAL MFG      |ACETATE FLAKE    |OTHER/NOT CLASFD |TONS PRODUCT
3 01 091 01 INDUSTRIAL PROCES|CHEMICAL MFG      |ACETONE          |OTHER/NOT CLASFD |TONS PRODUCT
3 01 100 01 INDUSTRIAL PROCES|CHEMICAL MFG      |MALEIC ANHYDRIDE |GENERAL/OTHER    |TONS PRODUCT
3 01 101 01 INDUSTRIAL PROCES|CHEMICAL MFG      |POLVINL PYRILIDON|GENERAL/OTHER    |TONS PRODUCT
3 01 110 01 INDUSTRIAL PROCES|CHEMICAL MFG      |SULFONIC ACID/ATS|GENERAL/OTHER    |TONS PRODUCT
3 01 900 99 INDUSTRIAL PROCES|CHEMICAL MFG      |WASTE GAS FLARES |OTHER/NOT CLASIFD|MILLION CUBIC FEET BURNED
3 01 999 99 INDUSTRIAL PROCES|CHEMICAL MFG      |OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS PRODUCT
3 02 001 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|ALFALFA DEHYDRATN|GENERAL          |TONS MEAL PRODUCED
3 02 001 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|ALFALFA DEHYDRATN|OTHER/NOT CLASFD |TONS PRODUCT
3 02 002 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COFFEE ROASTING  |DIRECTFIRE ROASTR|TONS GREEN BEANS
3 02 002 02 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COFFEE ROASTING  |INDIRCTFIREROASTR|TONS GREEN BEANS
3 02 002 03 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COFFEE ROASTING  |STONER/COOLER    |TONS GREEN BEANS
3 02 002 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COFFEE ROASTING  |OTHER/NOT CLASFD |TONS PRODUCT
3 02 003 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COFFEE-INSTANT   |SPRAY DRIER      |TONS GREEN BEANS
3 02 004 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COTTON GINNING   |UNLOADING FAN    |BALES COTTON
3 02 004 02 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COTTON GINNING   |CLEANER          |BALES COTTON
3 02 004 03 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COTTON GINNING   |STICK/BURR MACHNE|BALES COTTON
3 02 004 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COTTON GINNING   |OTHER/NOT CLASFD |BALES COTTON
3 02 005 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN TERMEL|SHIPING/RECEIVING|TONS GRAIN PROCESSED
3 02 005 02 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN TERMEL|TRANSFER/CONVEYNG|TONS GRAIN PROCESSED
3 02 005 03 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN TERMEL|SCREENING/CLEANNG|TONS GRAIN PROCESSED
3 02 005 04 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN TERMEL|DRYING           |TONS GRAIN PROCESSED
3 02 006 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN CNTRYE|SHIPNG/RECEIVNG  |TONS GRAIN PROCESSED
3 02 006 02 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN CNTRYE|TRANSFER/CONVEYNG|TONS GRAIN PROCESSED
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
   SCC ID                              SCC CATEGORY NAMES
   ******                            ********************
I II III IV        I                 II                III               IV                 UNITS

3 02 006 03 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN CNTRYE|SCREENING/CLEANNG|TONS GRAIN PROCESSED
3 02 006 04 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN CNTRYE|DRYING           |TONS GRAIN PROCESSED
3 02 006 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN       |OTHER/NOT CLASIFD|TONS GRAIN PROCESSED
3 02 007 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |CORN MEAL        |TONS GRAIN PROCESSED
3 02 007 02 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |SOY BEAN         |TONS GRAIN PROCESSED
3 02 007 03 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |BARLEY/WHEATCLEAN|TONS GRAIN PROCESSED
3 02 007 04 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |MILO CLEANER     |TONS GRAIN PROCESSED
3 02 007 05 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |BARLEYFLOUR MILL |TONS GRAIN PROCESSED
3 02 007 06 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |WET CORN MILLING |TONS OF PRODUCT
3 02 007 30 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |WHEAT FLOUR MILL |TONS PRODUCT
3 02 007 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |OTHER/NOT CLASFD |TONS PROCESSED
3 02 008 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED MANUFACTURE |BARLEY FEED-GENL |TONS GRAIN PROCESSED
3 02 008 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED MANUFACTURE |OTHER/NOT CLASFD |TONS PROCESSED
3 02 009 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FERMENTATN-BEER  |GRAIN HANDLING   |TONS GRAIN PROCESSED
3 02 009 02 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FERMENTATN-BEER  |DRYING SPNT GRAIN|TONS GRAIN PROCESSED
3 02 009 03 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FERMENTATION-BEER| BREWING         |THOUSANDS OF GALLONS
3 02 009 98 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FERMENTATION-BEER|OTHER/NOT CLASFD |GALLONS PRODUCT
3 02 009 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FERMENTATION-BEER|OTHER/NOT CLASFD |TONS GRAIN PROCESSED
3 02 010 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FERMENTATN-WHISKY|GRAIN HANDLING   |TONS GRAIN PROCESSED
3 02 010 02 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FERMENTATN-WHISKY|DRYING SPNT GRAIN|TONS GRAIN PROCESSED
3 02 010 03 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FERMENTATN-WHISKY|AGING            |TONS GRAIN PROCESSED
3 02 010 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FERMENTATN-WHISKY|OTHER/NOT CLASFD |GALLONS PRODUCT
3 02 011 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FERMENTATN-WINE  |GENERAL          |GALLONS PRODUCT
3 02 012 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FISH MEAL        |COOKERS-FRESHFISH|TONS FISH MEAL PRODUCED
3 02 012 02 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FISH MEAL        |COOKERS-STALEFISH|TONS FISH MEAL PRODUCED
3 02 012 03 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FISH MEAL        |DRIERS           |TONS FISH SCRAP
3 02 012 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FISH MEAL        |OTHER/NOT CLASIFD|TONS PROCESSED
3 02 013 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|MEAT SMOKING     |GENERAL          |TONS MEAT SMOKED
3 02 014 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|STARCH MFG       |GENERAL          |TONS STARCH PRODUCED
3 02 015 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|SUGAR CANE PROCES|GENERAL          |TONS SUGAR PRODUCED
3 02 015 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|SUGAR CANE PROCES|OTHER/NOT CLASIFD|TONS PROCESSED
3 02 016 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|SUGAR BEET PROCES|DRYER ONLY       |TONS RAW BEETS
3 02 016 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|SUGAR BEET PROCES|OTHER/NOT CLASIFD|TONS RAW BEETS
3 02 017 20 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|PEANUT PROCESSING|OIL/NOT CLASFD   |TONS PRODUCT
3 02 017 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|PEANUT PROCESSING|OTHER/NOT CLASFD |TONS PROCESSED
3 02 018 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|CANDY/CONFECTNRY |OTHER/NOT CLASFD |TONS PRODUCT
3 02 030 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|DAIRY PRODUCTS   |MILK SPRAY-DRYER |TONS PRODUCT
3 02 030 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|DAIRY PRODUCTS   |OTHER/NOT CLASFD |TONS PRODUCT
3 02 999 98 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS PROCESSED  (INPUT)
3 02 999 99 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS PRODUCED  (FINISHE
3 03 000 01 INDUSTRIAL PROCES|PRIMARY METALS   |ALUMINUM ORE-BAUX|CRUSHING/HANDLING|TONS OF ORE
3 03 001 01 INDUSTRIAL PROCES|PRIMARY METALS   |AL ORE-ELECROREDN|PREBAKE CELLS    |TONS ALUMINUM PRODUCED
3 03 001 02 INDUSTRIAL PROCES|PRIMARY METALS   |AL ORE-ELECROREDN|HORIZSTD SODERBRG|TONS ALUMINUM PRODUCED
3 03 001 03 INDUSTRIAL PROCES|PRIMARY METALS   |AL ORE-ELECROREDN|VERTSTD SODERBRG |TONS ALUMINUM PRODUCED
3 03 001 04 INDUSTRIAL PROCES|PRIMARY METALS   |AL ORE-ELECROREDN|MATERIALS HANDLNG|TONS ALUMINUM PRODUCED
3 03 001 05 INDUSTRIAL PROCES|PRIMARY METALS   |AL ORE-ELECROREDN|ANODE BAKE FURNCE|TONS ALUMINUM PRODUCED
3 03 001 99 INDUSTRIAL PROCES|PRIMARY METALS   |ALUMINUM OPERATN |OTHER/NOT CLASFD |TONS ALUMINUM PRODUCED
3 03 002 01 INDUSTRIAL PROCES|PRIMARY METALS   |AL ORE-CALC ALHYD|GENERAL          |TONS ALUMINUM PRODUCED
3 03 003 01 INDUSTRIAL PROCES|PRIMARY METALS   |COKE MET BYPRODUC|GENERAL          |TONS COAL CHARGED
3 03 003 02 INDUSTRIAL PROCES|PRIMARY METALS   |COKE-MET BYPRODUC|OVEN CHARGING    |TONS COAL CHARGED
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
  SCC ID                                    SCC CATEGORY NAMES
  ******                                    ******************
I II III IV           I                 II                  III                 IV                   UNITS

3 03 003 03 INDUSTRIAL PROCES|PRIMARY METALS   |COKE-MET BYPRODUC|OVEN PUSHING       |TONS COAL CHARGED
3 03 003 04 INDUSTRIAL PROCES|PRIMARY METALS   |COKE-MET BYPRODUC|QUENCHING          |TONS COAL CHARGED
3 03 003 05 INDUSTRIAL PROCES|PRIMARY METALS   |COKE-MET BYPRODUC|UNLOADING          |TONS COAL CHARGED
3 03 003 06 INDUSTRIAL PROCES|PRIMARY METALS   |COKE-MET BYPRODUC|UNDERFIRING        |TONS COAL CHARGED
3 03 003 99 INDUSTRIAL PROCES|PRIMARY METALS   |COKE-MET BYPRODUC|OTHER/NOT CLASFD   |TONS COAL CHARGED
3 03 004 01 INDUSTRIAL PROCES|PRIMARY METALS   |COKE MET-BEEHIVE |GENERAL            |TONS COAL CHARGED
3 03 005 01 INDUSTRIAL PROCES|PRIMARY METALS   |COPPER SMELTER   |TOTAL/GENERAL      |TONS CONCENTRATED ORE
3 03 005 02 INDUSTRIAL PROCES|PRIMARY METALS   |COPPER SMELTER   |ROASTING           |TONS CONCENTRATED ORE
3 03 005 03 INDUSTRIAL PROCES|PRIMARY METALS   |COPPER SMELTER   |SMELTING           |TONS CONCENTRATED ORE
3 03 005 04 INDUSTRIAL PROCES|PRIMARY METALS   |COPPER SMELTER   |CONVERTING         |TONS CONCENTRATED ORE
3 03 005 05 INDUSTRIAL PROCES|PRIMARY METALS   |COPPER SMELTER   |REFINING           |TONS CONCENTRATED ORE
3 03 005 06 INDUSTRIAL PROCES|PRIMARY METALS   |COPPER MINE      |ORE DRYER          |TONS OF ORE
3 03 005 99 INDUSTRIAL PROCES|PRIMARY METALS   |COPPER SMELTER   |OTHER/NOT CLASFD   |TONS CONCENTRATED ORE
3 03 006 01 INDUSTRIAL PROCES|PRIMARY METALS   |FERALLOY OPEN FNC|50% FESI           |TONS PRODUCED
3 03 006 02 INDUSTRIAL PROCES|PRIMARY METALS   |FERALLOY OPEN FNC|75% FESI           |TONS PRODUCED
3 03 006 03 INDUSTRIAL PROCES|PRIMARY METALS   |FERALLOY OPEN FNC|90% FESI           |TONS PRODUCED
3 03 006 04 INDUSTRIAL PROCES|PRIMARY METALS   |FERALLOY OPEN FNC|SILICON METAL      |TONS PRODUCED
3 03 006 05 INDUSTRIAL PROCES|PRIMARY METALS   |FERALLOY OPEN FNC|SILICOMANGANESE    |TONS PRODUCED
3 03 006 10 INDUSTRIAL PROCES|PRIMARY METALS   |FERROALLOY       |SCREENING          |TONS PROCESSED
3 03 006 11 INDUSTRIAL PROCES|PRIMARY METALS   |FERROALLOY       |ORE DRYER          |TONS PROCESSED
3 03 006 12 INDUSTRIAL PROCES|PRIMARY METALS   |FERROALLOY       |LOWCARB CR-RE-CTR|TONS PROCESSED
3 03 006 99 INDUSTRIAL PROCES|PRIMARY METALS   |FERROALLOY       |OTHER/NOT CLASFD   |TONS PRODUCED
3 03 007 01 INDUSTRIAL PROCES|PRIMARY METALS   |FERALOY SEMCOVFNC|FEROMANGANESE      |TONS PRODUCED
3 03 007 02 INDUSTRIAL PROCES|PRIMARY METALS   |FERALOY COVD FNC |GENERAL            |TONS PRODUCED
3 03 008 01 INDUSTRIAL PROCES|PRIMARY METALS   |IRON PRODUCTION  |BLAST FNC-ORECHG   |TONS PRODUCED
3 03 008 02 INDUSTRIAL PROCES|PRIMARY METALS   |IRON PRODUCTION  |BLAST FNC-AGLCHG   |TONS PRODUCED
3 03 008 03 INDUSTRIAL PROCES|PRIMARY METALS   |IRON PRODUCTION  |SINTERING GENERAL|TONS PRODUCED
3 03 008 04 INDUSTRIAL PROCES|PRIMARY METALS   |IRON PRODUCTION  |ORE-CRUSH/HANDLE   |TONS OF ORE
3 03 008 05 INDUSTRIAL PROCES|PRIMARY METALS   |IRON PRODUCTION  |SCARFING           |TONS PROCESSED
3 03 008 06 INDUSTRIAL PROCES|PRIMARY METALS   |IRON PRODUCTION  |SAND HANDLING OPN|TONS HANDLED
3 03 008 07 INDUSTRIAL PROCES|PRIMARY METALS   |IRON PRODUCTION  |MOLD OVENS         |TONS SAND BAKED
3 03 008 99 INDUSTRIAL PROCES|PRIMARY METALS   |IRON PRODUCTION  |OTHER/NOT CLASFD   |TONS PRODUCED
3 03 009 01 INDUSTRIAL PROCES|PRIMARY METALS   |STEEL PRODUCTION |OPNHEARTH W/LANCE|TONS PRODUCED
3 03 009 02 INDUSTRIAL PROCES|PRIMARY METALS   |STEEL PRODUCTION |OPNHEARTH NOLNCE|TONS PRODUCED
3 03 009 03 INDUSTRIAL PROCES|PRIMARY METALS   |STEEL PRODUCTION |BOF-GENERAL        |TONS PRODUCED
3 03 009 04 INDUSTRIAL PROCES|PRIMARY METALS   |STEEL PRODUCTION |ELECT ARC W/LANCE|TONS PRODUCED
3 03 009 05 INDUSTRIAL PROCES|PRIMARY METALS   |STEEL PRODUCTION |ELECT ARC NOLANCE|TONS PRODUCED
3 03 009 99 INDUSTRIAL PROCES|PRIMARY METALS   |STEEL PRODUCTION |OTHER/NOT CLASFD   |TONS PRODUCED
3 03 010 01 INDUSTRIAL PROCES|PRIMARY METALS   |LEAD SMELTERS    |SINTER/CRUSHING    |TONS CONCENTRATED ORE
3 03 010 02 INDUSTRIAL PROCES|PRIMARY METALS   |LEAD SMELTERS    |BLAST FURNACE      |TONS CONCENTRATED ORE
3 03 010 03 INDUSTRIAL PROCES|PRIMARY METALS   |LEAD SMELTERS    |REVERB FURNACE     |TONS CONCENTRATED ORE
3 03 010 99 INDUSTRIAL PROCES|PRIMARY METALS   |LEAD SMELTERS    |OTHER/NOT CLASFD   |TONS CONCENTRATED ORE
3 03 011 01 INDUSTRIAL PROCES|PRIMARY METALS   |MOLYBNUM MINING  |GENERAL            |HUNDREDS OF TONS MINED
3 03 011 02 INDUSTRIAL PROCES|PRIMARY METALS   |MOLYBNUM MILLING |GENERAL            |TONS PRODUCT
3 03 011 99 INDUSTRIAL PROCES|PRIMARY METALS   |MOLYBNUM PROCES  |OTHER/NOT CLASIFD|TONS PROCESSED
3 03 012 01 INDUSTRIAL PROCES|PRIMARY METALS   |TITANIUM PROCESS |CHLORINATION STAT|TONS PRODUCT
3 03 012 99 INDUSTRIAL PROCES|PRIMARY METALS   |TITANIUM PROCES  |OTHER/NOT CLASIFD|TONS PROCESSED
3 03 013 01 INDUSTRIAL PROCES|PRIMARY METALS   |GOLD             |MINING/PROCESSING|TONS ORE
3 03 014 01 INDUSTRIAL PROCES|PRIMARY METALS   |BARIUM           |ORE GRIND          |TONS PROCESSED
3 03 014 02 INDUSTRIAL PROCES|PRIMARY METALS   |BARIUM           |REDUCTN KILN       |TONS PROCESSED
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
  SCC  ID                                 SCC CATEGORY NAMES
  ******                              *******************
I II III IV           I                    II                III                   IV                   UNITS

3 03 014 03 INDUSTRIAL PROCES|PRIMARY METALS    |BARIUM               |DRIERS/CALCINERS |TONS PROCESSED
3 03 014 99 INDUSTRIAL PROCES|PRIMARY METALS    |BARIUM               |OTHER/NOT CLASFD |TONS PROCESSED
3 03 030 01 INDUSTRIAL PROCES|PRIMARY METALS    |ZINC SMELTING        |GENERAL          |TONS PROCESSED
3 03 030 02 INDUSTRIAL PROCES|PRIMARY METALS    |ZINC SMELTING        |ROASTNG/MULT-HRTH|TONS PROCESSED
3 03 030 03 INDUSTRIAL PROCES|PRIMARY METALS    |ZINC SMELTING        |SINTERING        |TONS PROCESSED
3 03 030 04 INDUSTRIAL PROCES|PRIMARY METALS    |ZINC SMELTING        |HORIZ RETORTS    |TONS PROCESSED
3 03 030 05 INDUSTRIAL PROCES|PRIMARY METALS    |ZINC SMELTING        |VERT RETORTS     |TONS PROCESSED
3 03 030 06 INDUSTRIAL PROCES|PRIMARY METALS    |ZINC SMELTING        |ELECTROLYTIC PROC|TONS PROCESSED
3 03 030 99 INDUSTRIAL PROCES|PRIMARY METALS    |ZINC SMELTING        |OTHER/NOT CLASFD |TONS PROCESSED
3 03 999 99 INDUSTRIAL PROCES|PRIMARY METALS    |OTHER/NOT CLASFD     |SPECIFY IN REMARK|TONS PRODUCED
3 04 001 01 INDUSTRIAL PROCES|SECONDARY METALS  |ALUMINUM OPERATN     |SWEATINGFURNACE  |TONS PRODUCED
3 04 001 02 INDUSTRIAL PROCES|SECONDARY METALS  |ALUMINUM OPERATN     |SMELT-CRUCIBLE   |TONS METAL PRODUCED
3 04 001 03 INDUSTRIAL PROCES|SECONDARY METALS  |ALUMINUM OPERATN     |SMELT-REVERB FNC |TONS METAL PRODUCED
3 04 001 04 INDUSTRIAL PROCES|SECONDARY METALS  |ALUMINUM OPERATN     |CHLORINATN STATN |TONS METAL PRODUCED
3 04 001 10 INDUSTRIAL PROCES|SECONDARY METALS  |ALUMINUM OPERATN     |FOIL ROLLING     |TONS PRODUCT
3 04 001 11 INDUSTRIAL PROCES|SECONDARY METALS  |ALUMINUM OPERATN     |FOIL CONVERTING  |TONS PRODUCED
3 04 001 20 INDUSTRIAL PROCES|SECONDARY METALS  |ALUMINUM OPERATN     |CAN MANUFACTURE  |TONS PRODUCED
3 04 001 50 INDUSTRIAL PROCES|SECONDARY METALS  |ALUMINUM OPERATN     |ROLL-DRAW-EXTRUDE|TONS PRODUCED
3 04 001 99 INDUSTRIAL PROCES|SECONDARY METALS  |ALUMINUM OPERATN     |OTHER/NOT CLASFD |TONS PRODUCED
3 04 002 01 INDUSTRIAL PROCES|SECONDARY METALS  |BRASS/BRONZ MELT     |BLAST FNC        |TONS CHARGE
3 04 002 02 INDUSTRIAL PROCES|SECONDARY METALS  |BRASS/BRONZ MELT     |CRUCIBLE FNC     |TONS CHARGE
3 04 002 03 INDUSTRIAL PROCES|SECONDARY METALS  |BRASS/BRONZ MELT     |CUPOLA FNC       |TONS CHARGE
3 04 002 04 INDUSTRIAL PROCES|SECONDARY METALS  |BRASS/BRONZ MELT     |ELECT INDUCTION  |TONS CHARGE
3 04 002 05 INDUSTRIAL PROCES|SECONDARY METALS  |BRASS/BRONZ MELT     |REVERB FNC       |TONS CHARGE
3 04 002 06 INDUSTRIAL PROCES|SECONDARY METALS  |BRASS/BRONZ MELT     |ROTARY FNC       |TONS CHARGE
3 04 002 99 INDUSTRIAL PROCES|SECONDARY METALS  |BRASS/BRONZ MELT     |OTHER/NOT CLASIFD|TONS PRODUCED
3 04 003 01 INDUSTRIAL PROCES|SECONDARY METALS  |GRAY IRON            |CUPOLA           |TONS METAL CHARGE
3 04 003 02 INDUSTRIAL PROCES|SECONDARY METALS  |GRAY IRON            |REVERB FNC       |TONS METAL CHARGE
3 04 003 03 INDUSTRIAL PROCES|SECONDARY METALS  |GRAY IRON            |ELECT INDUCTION  |TONS METAL CHARGE
3 04 003 05 INDUSTRIAL PROCES|SECONDARY METALS  |GRAY IRON            |ANNEALING OPERATN|TONS METAL CHARGE
3 04 003 30 INDUSTRIAL PROCES|SECONDARY METALS  |GRAY IRON            |MISC CAST-FABCTN |TONS PROCESSED
3 04 003 40 INDUSTRIAL PROCES|SECONDARY METALS  |GRAY IRON            |GRINDING-CLEANING|TONS PROCESSED
3 04 003 99 INDUSTRIAL PROCES|SECONDARY METALS  |GRAY IRON            |OTHER/NOT CLASIFD|TONS METAL CHARGE
3 04 004 01 INDUSTRIAL PROCES|SECONDARY METALS  |LEAD SMELT SEC       |POT FURNACE      |TONS PROCESSED
3 04 004 02 INDUSTRIAL PROCES|SECONDARY METALS  |LEAD SMELT SEC       |REVERB FNC       |TONS PROCESSED
3 04 004 03 INDUSTRIAL PROCES|SECONDARY METALS  |LEAD SMELT SEC       |BLAST/CUPOLA FNC |TONS PROCESSED
3 04 004 04 INDUSTRIAL PROCES|SECONDARY METALS  |LEAD SMELT SEC       |ROTARY REVERB FNC|TONS PROCESSED
3 04 004 08 INDUSTRIAL PROCES|SECONDARY METALS  |LEAD SMELT SEC       |LEAD OXIDE MFG   |TONS PROCESSED
3 04 004 99 INDUSTRIAL PROCES|SECONDARY METALS  |LEAD SMELT SEC       |OTHER/NOT CLASIFD|TONS PROCESSED
3 04 005 01 INDUSTRIAL PROCES|SECONDARY METALS  |LEAD BATTERY         |GENERAL          |TONS PROCESSED
3 04 005 99 INDUSTRIAL PROCES|SECONDARY METALS  |LEAD BATTERY         |OTHER/NOT CLASIFD|TONS PROCESSED
3 04 006 01 INDUSTRIAL PROCES|SECONDARY METALS  |MAGNESIUM SEC        |POT FURNACE      |TONS PROCESSED
3 04 006 99 INDUSTRIAL PROCES|SECONDARY METALS  |MAGNESIUM SEC        |OTHER/NOT CLASIFD|TONS PROCESSED
3 04 007 01 INDUSTRIAL PROCES|SECONDARY METALS  |STEEL FOUNDRY        |ELECTRIC ARC FNC |TONS PROCESSED
3 04 007 02 INDUSTRIAL PROCES|SECONDARY METALS  |STEEL FOUNDRY        |OPEN HEARTH FNC  |TONS PROCESSED
3 04 007 03 INDUSTRIAL PROCES|SECONDARY METALS  |STEEL FOUNDRY        |OPEN HEARTH LANCD|TONS PROCESSED
3 04 007 04 INDUSTRIAL PROCES|SECONDARY METALS  |STEEL FOUNDRY        |HEAT-TREAT FNC   |TONS PROCESSED
3 04 007 05 INDUSTRIAL PROCES|SECONDARY METALS  |STEEL FOUNDRY        |INDUCTION FURNACE|TONS PROCESSED
3 04 007 99 INDUSTRIAL PROCES|SECONDARY METALS  |STEEL FOUNDRY        |OTHER/NOT CLASIFD|TONS PROCESSED
3 04 008 01 INDUSTRIAL PROCES|SECONDARY METALS  |ZINC SEC             |RETORT FNC       |TONS PRODUCED
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
  SCC ID                                SCC CATEGORY NAMES
  ******                                ******************
I II III IV             I                  II                 III                 IV                 UNITS

3 04 008 02 INDUSTRIAL PROCES|SECONDARY METALS |ZINC SEC         |HORIZ MUFFLE FNC |TONS PRODUCED
3 04 008 03 INDUSTRIAL PROCES|SECONDARY METALS |ZINC SEC         |POT FURNACE      |TONS PRODUCED
3 04 008 04 INDUSTRIAL PROCES|SECONDARY METALS |ZINC SEC         |KETTLE-SWEAT FNC |TONS PRODUCED
3 04 008 05 INDUSTRIAL PROCES|SECONDARY METALS |ZINC SEC         |GALVANIZING KETTL|TONS PRODUCED
3 04 008 06 INDUSTRIAL PROCES|SECONDARY METALS |ZINC SEC         |CALCINING KILN   |TONS PRODUCED
3 04 008 07 INDUSTRIAL PROCES|SECONDARY METALS |ZINC SEC         |CONCENTRATE DRYER|TONS PROCESSED
3 04 008 08 INDUSTRIAL PROCES|SECONDARY METALS |ZINC SEC         |REVERB-SWEAT FNC |TONS PRODUCED
3 04 008 99 INDUSTRIAL PROCES|SECONDARY METALS |ZINC SEC         |OTHER/NOT CLASIFD|TONS PROCESSED
3 04 009 01 INDUSTRIAL PROCES|SECONDARY METALS |MALLEABLE IRON   |ANNEALING OPERATN|TONS METAL CHARGE
3 04 009 99 INDUSTRIAL PROCES|SECONDARY METALS |MALLEABLE IRON   |OTHER/NOT CLASIFD|TONS METAL CHARGE
3 04 010 01 INDUSTRIAL PROCES|SECONDARY METALS |NICKEL           |FLUX FURNACE     |TONS PROCESSED
3 04 010 99 INDUSTRIAL PROCES|SECONDARY METALS |NICKEL           |OTHER/NOT CLASIFD|TONS PROCESSED
3 04 011 01 INDUSTRIAL PROCES|SECONDARY METALS |ZIRCONIUM        |OXIDE KILN       |TONS PROCESSED
3 04 011 99 INDUSTRIAL PROCES|SECONDARY METALS |ZIRCONIUM        |OTHER/NOT CLASIFD|TONS PROCESSED
3 04 020 01 INDUSTRIAL PROCES|SECONDARY METALS |FURNACE ELECTRODE|CALCINATION      |TONS PROCESSED
3 04 020 02 INDUSTRIAL PROCES|SECONDARY METALS |FURNACE ELECTRODE|MIXING           |TONS PROCESSED
3 04 020 03 INDUSTRIAL PROCES|SECONDARY METALS |FURNACE ELECTRODE|PITCH TREATING   |TONS PROCESSED
3 04 020 04 INDUSTRIAL PROCES|SECONDARY METALS |FURNACE ELECTRODE|BAKE FURNACES    |TONS PROCESSED
3 04 020 99 INDUSTRIAL PROCES|SECONDARY METALS |FURNACE ELECTRODE|OTHER/NOT CLASIFD|TONS PROCESSED
3 04 050 01 INDUSTRIAL PROCES|SECONDARY METALS |MISC CAST&FABRCTN|SPECIFY IN REMARK|TONS PRODUCED
3 04 999 99 INDUSTRIAL PROCES|SECONDARY METALS |OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS PROCESSED
3 05 001 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |ASPHALT ROOFING  |BLOWING OPERATION|TONS SATURATED FELT PRODUCED
3 05 001 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |ASPHALT ROOFING  |DIPPING ONLY     |TONS SATURATED FELT PRODUCED
3 05 001 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |ASPHALT ROOFING  |SPRAYING ONLY    |TONS SATURATED FELT PRODUCED
3 05 001 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |ASPHALT ROOFING  |DIPPING/SPRAYING |TONS SATURATED FELT PRODUCED
3 05 001 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |ASPHALT ROOFING  |OTHER/NOT CLASIFD|TONS SATURATED FELT PRODUCED
3 05 002 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |ASPHALTIC CONCRET|ROTARY DRYER     |TONS PRODUCED
3 05 002 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |ASPHALTIC CONCRET|OTHER SOURCES    |TONS PRODUCED
3 05 002 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |ASPHALTIC CONCRET|OTHER/NOT CLASIFD|TONS PRODUCED
3 05 003 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |BRICK MANUFACTURE|DRYING-RAW MTL   |TONS PRODUCED
3 05 003 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |BRICK MANUFACTURE|GRINDING-RAW MTL |TONS PRODUCED
3 05 003 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |BRICK MANUFACTURE|STORAGE-RAW MTL  |TONS PRODUCED
3 05 003 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |BRICK MANUFACTURE|CURING GAS FIRED |TONS PRODUCED
3 05 003 05 INDUSTRIAL PROCES|MINERAL PRODUCTS |BRICK MANUFACTURE|CURING OIL FIRED |TONS PRODUCED
3 05 003 06 INDUSTRIAL PROCES|MINERAL PRODUCTS |BRICK MANUFACTURE|CURING COAL FIRED|TONS PRODUCED
3 05 003 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |BRICK MANUFACTURE|OTHER/NOT CLASIFD|TONS PRODUCED
3 05 004 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |CALCIUM CARBIDE  |ELECTRIC FNC     |TONS PRODUCED
3 05 004 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |CALCIUM CARBIDE  |COKE DRYER       |TONS PRODUCED
3 05 004 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |CALCIUM CARBIDE  |FNC ROOM VENTS   |TONS PRODUCED
3 05 004 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |CALCIUM CARBIDE  |OTHER/NOT CLASIFD|TONS PROCESSED
3 05 005 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |CASTABLE REFRACTY|RAWMATL DRYER    |TONS FEED MATERIAL
3 05 005 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |CASTABLE REFRACTY|RAWMATL CRUSH/PRC|TONS FEED MATERIAL
3 05 005 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |CASTABLE REFRACTY|ELECTRIC ARC MELT|TONS FEED MATERIAL
3 05 005 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |CASTABLE REFRACTY|CURING OVEN      |TONS FEED MATERIAL
3 05 005 05 INDUSTRIAL PROCES|MINERAL PRODUCTS |CASTABLE REFRACTY|MOLDS/SHAKEOUT   |TONS FEED MATERIAL
3 05 005 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |CASTABLE REFRACTY|OTHER/NOT CLASIFD|TONS FEED MATERIAL
3 05 006 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |CEMENT MFG DRY   |KILNS            |BARRELS CEMENT PRODUCED
3 05 006 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |CEMENT MFG DRY   |DRYERS/GRINDRSETC|BARRELS CEMENT PRODUCED
3 05 006 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |CEMENT MFG DRY   |KILNS-OIL FIRED  |TONS CEMENT PRODUCED
3 05 006 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |CEMENT MFG DRY   |KILNS-GAS FIRED  |TONS CEMENT PRODUCED
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
    SCC ID                                    SCC CATEGORY NAMES
    ******                                    ******************
I II III IV          I                   II                 III                 IV                 UNITS

3 05 006 06 INDUSTRIAL PROCESIMINERAL PRODUCTS ICEMENT MFG DRY   IKILNS-COAL FIRED ITONS CEMENT PRODUCED
3 05 006 99 INDUSTRIAL PROCESIMINERAL PRODUCTS ICEMENT MFG DRY   IOTHER/NOT CLASIFDITONS CEMENT PRODUCED
3 05 007 01 INDUSTRIAL PROCESIMINERAL PRODUCTS ICEMENT MFG WET   IKILNS            IBARRELS CEMENT PRODUCED
3 05 007 02 INDUSTRIAL PROCESIMINERAL PRODUCTS ICEMENT MFG WET   IDRYERS/GRINDERETCIBARRELS CEMENT PRODUCED
3 05 007 03 INDUSTRIAL PROCESIMINERAL PRODUCTS ICEMENT MFG WET   IKILNS-OIL FIRED  ITONS CEMENT PRODUCED
3 05 007 04 INDUSTRIAL PROCESIMINERAL PRODUCTS ICEMENT MFG WET   IKILNS GAS FIRED  ITONS CEMENT PRODUCED
3 05 007 05 INDUSTRIAL PROCESIMINERAL PRODUCTS ICEMENT MFG WET   IKILNS-COAL FIRED ITONS CEMENT PRODUCED
3 05 007 99 INDUSTRIAL PROCESIMINERAL PRODUCTS ICEMENT MFG WET   IOTHER/NOT CLASIFDITONS CEMENT PRODUCED
3 05 008 01 INDUSTRIAL PROCESIMINERAL PRODUCTS ICERAMIC/CLAY MFG IDRYING           ITONS INPUT TO PROCESS
3 05 008 02 INDUSTRIAL PROCESIMINERAL PRODUCTS ICERAMIC/CLAY MFG IGRINDING         ITONS INPUT TO PROCESS
3 05 008 03 INDUSTRIAL PROCESIMINERAL PRODUCTS ICERAMIC/CLAY MFG ISTORAGE          ITONS INPUT TO PROCESS
3 05 008 99 INDUSTRIAL PROCESIMINERAL PRODUCTS ICERAMIC/CLAY MFG IOTHER/NOT CLASIFDITONS PRODUCED
3 05 009 01 INDUSTRIAL PROCESIMINERAL PRODUCTS ICLAY/FLYASHSINTERIFLYASH           ITONS FINISHED PRODUCT
3 05 009 02 INDUSTRIAL PROCESIMINERAL PRODUCTS ICLAY/FLYASHSINTERICLAY/CORE        ITONS FINISHED PRODUCT
3 05 009 03 INDUSTRIAL PROCESIMINERAL PRODUCTS ICLAY/FLYASHSINTERINATURAL CLAY     ITONS FINISHED PRODUCT
3 05 009 99 INDUSTRIAL PROCESIMINERAL PRODUCTS ICLAY/FLYASHSINTERIOTHER/NOT CLASIFDITONS PRODUCED
3 05 010 01 INDUSTRIAL PROCESIMINERAL PRODUCTS ICOAL CLEANING    ITHERM/FLUID BED  ITONS COAL DRIED
3 05 010 02 INDUSTRIAL PROCESIMINERAL PRODUCTS ICOAL CLEANING    ITHERM/FLASH      ITONS COAL DRIED
3 05 010 03 INDUSTRIAL PROCESIMINERAL PRODUCTS ICOAL CLEANING    ITHERM/MULTILOUVRDITONS COAL DRIED
3 05 010 99 INDUSTRIAL PROCESIMINERAL PRODUCTS ICOAL CLEANING    IOTHER/NOT CLASIFDITONS COAL CLEANED
3 05 011 01 INDUSTRIAL PROCESIMINERAL PRODUCTS ICONCRETE BATCHINGIGENERAL          ICUBIC YARDS CONCRETE PRODUCED
3 05 011 20 INDUSTRIAL PROCESIMINERAL PRODUCTS ICONCRETE BATCHINGIASBEST/CEMNT PDTSITONS PRODUCT
3 05 011 99 INDUSTRIAL PROCESIMINERAL PRODUCTS ICONCRETE BATCHINGIOTHER/NOT CLASFD ITONS PRODUCT
3 05 012 01 INDUSTRIAL PROCESIMINERAL PRODUCTS IFIBERGLASS MFG   IREVERBFNC-REGENEXITONS MATERIAL PROCESSED
3 05 012 02 INDUSTRIAL PROCESIMINERAL PRODUCTS IFIBERGLASS MFG   IREVERBFNC-RECUPEXITONS MATERIAL PROCESSED
3 05 012 03 INDUSTRIAL PROCESIMINERAL PRODUCTS IFIBERGLASS MFG   IELECTRIC IND FNC ITONS MATERIAL PROCESSED
3 05 012 04 INDUSTRIAL PROCESIMINERAL PRODUCTS IFIBERGLASS MFG   IFORMING LINE     ITONS MATERIAL PROCESSED
3 05 012 05 INDUSTRIAL PROCESIMINERAL PRODUCTS IFIBERGLASS MFG   ICURING OVEN      ITONS MATERIAL PROCESSED
3 05 012 99 INDUSTRIAL PROCESIMINERAL PRODUCTS IFIBERGLASS MFG   IOTHER/NOT CLASIFDITONS PROCESSED
3 05 013 01 INDUSTRIAL PROCESIMINERAL PRODUCTS IFRIT MFG         IROTARY FNC GENL  ITONS CHARGE
3 05 013 99 INDUSTRIAL PROCESIMINERAL PRODUCTS IFRIT MFG         IOTHER/NOT CLASIFDITONS CHARGED
3 05 014 01 INDUSTRIAL PROCESIMINERAL PRODUCTS IGLASS MFG        ISODALIME GENL FNCITONS GLASS PRODUCED
3 05 014 10 INDUSTRIAL PROCESIMINERAL PRODUCTS IGLASS MFG        IRAW MAT REC/STORGITONS PROCESSED
3 05 014 11 INDUSTRIAL PROCESIMINERAL PRODUCTS IGLASS MFG        IBATCHING/MIXING  ITONS PROCESSED
3 05 014 12 INDUSTRIAL PROCESIMINERAL PRODUCTS IGLASS MFG        IMOLTEN HOLD TANKSITONS PROCESSED
3 05 014 99 INDUSTRIAL PROCESIMINERAL PRODUCTS IGLASS MFG        IOTHER/NOT CLASIFDITONS PRODUCED
3 05 015 01 INDUSTRIAL PROCESIMINERAL PRODUCTS IGYPSUM MFG       IRW MTL DRYER     ITONS THROUGHPUT
3 05 015 02 INDUSTRIAL PROCESIMINERAL PRODUCTS IGYPSUM MFG       IPRIMARY GRINDER  ITONS THROUGHPUT
3 05 015 03 INDUSTRIAL PROCESIMINERAL PRODUCTS IGYPSUM MFG       ICALCINER         ITONS THROUGHPUT
3 05 015 04 INDUSTRIAL PROCESIMINERAL PRODUCTS IGYPSUM MFG       ICONVEYING        ITONS THROUGHPUT
3 05 015 99 INDUSTRIAL PROCESIMINERAL PRODUCTS IGYPSUM MFG       IOTHER/NOT CLASIFDITONS THROUGHPUT
3 05 016 01 INDUSTRIAL PROCESIMINERAL PRODUCTS ILIME MFG         IPRIMARY CRUSHING ITONS PROCESSED
3 05 016 02 INDUSTRIAL PROCESIMINERAL PRODUCTS ILIME MFG         ISECNDRY CRUSHING ITONS PROCESSED
3 05 016 03 INDUSTRIAL PROCESIMINERAL PRODUCTS ILIME MFG         ICALCINNG-VERTKILNITONS PROCESSED
3 05 016 04 INDUSTRIAL PROCESIMINERAL PRODUCTS ILIME MFG         ICALCINNG-ROTYKILNITONS PROCESSED
3 05 016 99 INDUSTRIAL PROCESIMINERAL PRODUCTS ILIME MFG         IOTHER/NOT CLASIFDITONS PROCESSED
3 05 017 01 INDUSTRIAL PROCESIMINERAL PRODUCTS IMINERAL WOOL     ICUPOLA           ITONS CHARGE
3 05 017 02 INDUSTRIAL PROCESIMINERAL PRODUCTS IMINERAL WOOL     IREVERB FNC       ITONS CHARGE
3 05 017 03 INDUSTRIAL PROCESIMINERAL PRODUCTS IMINERAL WOOL     IBLOW CHAMBER     ITONS CHARGE
3 05 017 04 INDUSTRIAL PROCESIMINERAL PRODUCTS IMINERAL WOOL     ICURING OVEN      ITONS CHARGE
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
   SCC ID                                    SCC CATEGORY NAMES
   ******                                    ******************
I II III IV           I                   II              III                IV                 UNITS

3 05 017 05 INDUSTRIAL PROCES|MINERAL PRODUCTS |MINERAL WOOL     |COOLER           |TONS CHARGE
3 05 017 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |MINERAL WOOL     |OTHER/NOT CLASIFD|TONS PROCESSED
3 05 018 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |PERLITE MFG      |VERTICAL FNC GEN |TONS CHARGE
3 05 018 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |PERLITE MFG      |OTHER/NOT CLASIFD|TONS PROCESSED
3 05 019 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |PHOSPHATE ROCK   |DRYING           |TONS PHOSPHATE ROCK
3 05 019 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |PHOSPHATE ROCK   |GRINDING         |TONS PHOSPHATE ROCK
3 05 019 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |PHOSPHATE ROCK   |TRANSFER/STORAGE |TONS PHOSPHATE ROCK
3 05 019 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |PHOSPHATE ROCK   |OPEN STORAGE     |TONS PHOSPHATE ROCK
3 05 019 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |PHOSPHATE  ROCK  |OTHER/NOT CLASIFD|TONS PROCESSED
3 05 020 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PROC |PRIMARY CRUSHING |TONS RAW MATERIAL
3 05 020 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PROC |SEC CRUSH/SCREEN |TONS RAW MATERIAL
3 05 020 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PROC |TERT CRUSH/SCREEN|TONS RAW MATERIAL
3 05 020 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PROC |RECRUSH/SCREENING|TONS RAW MATERIAL
3 05 020 05 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PROC |FINES MILL       |TONS RAW MATERIAL
3 05 020 06 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PROC |SCREEN/CONVY/HNDL|TONS PRODUCT
3 05 020 07 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PROC |OPEN STORAGE     |TONS PRODUCT STORED
3 05 020 08 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARRY PROC|CUT STONE-GENERAL|TONS PROCESSED
3 05 020 09 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARRY PROC|BLASTING-GENERAL |TONS PROCESSED
3 05 020 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARRY PROC|OTHER/NOT CLASIFD|TONS PROCESSED
3 05 021 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |SALT MINING      |GENERAL          |TONS MINED
3 05 022 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |POTASH PRODUCTION|MINE-GRIND/DRY   |TONS ORE
3 05 022 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |POTASH PRODUCTION|OTHER/NOT CLASIFD|TONS PROCESSED
3 05 023 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |CALCIUM BORATE   |MINING/PROCESSING|TONS PRODUCT
3 05 023 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |CALCIUM BORATE   |OTHER/NOT CLASIFD|TONS PROCESSED
3 05 024 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |MG CARBONATE     |MINE/PROCESS     |TONS PRODUCT
3 05 024 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |MG CARBONATE     |OTHER/NOT CLASIFD|TONS PROCESSED
3 05 025 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |SAND/GRAVEL      |CRUSHING/SCREENIN|TONS PRODUCT
3 05 025 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |SAND/GRAVEL      |OTHER/NOT CLASIFD|TONS PROCESSED
3 05 026 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |DIATOMACOUS EARTH|HANDLING         |TONS PRODUCT
3 05 026 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |DIATOMACOUS EARTH|OTHER/NOT CLASIFD|TONS PROCESSED
3 05 030 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |CERAMIC ELECT PTS|OTHER/NOT CLASIFD|TONS PROCESSED
3 05 999 99 INDUSTRIAL PROCES|MINERAL PRODUCTS |OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS PRODUCT
3 06 001 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |PROCESS HEATER   |OIL              |1000 BARRELS OIL BURNED
3 06 001 02 INDUSTRIAL PROCES|PETROLEUM INDRY  |PROCESS HEATER   |GAS              |1000 CUBIC FEET GAS BURNED
3 06 001 03 INDUSTRIAL PROCES|PETROLEUM INDRY  |PROCESS HEATER   |OIL              |1000 GALLONS OIL BURNED
3 06 001 04 INDUSTRIAL PROCES|PETROLEUM INDRY  |PROCESS HEATER   |GAS              |MILLION CUBIC FEET BURNED
3 06 002 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |FLUID CRACKERS   |GENERAL (FCC)    |1000 BARRELS FRESH FEED
3 06 003 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |MOV-BED CAT-CRACK|GENERAL (TCC)    |1000 BARRELS FRESH FEED
3 06 004 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |BLOW-DOWN SYSTM  |W/CONTROLS       |1000 BARRELS REFINERY CAPACITY
3 06 004 02 INDUSTRIAL PROCES|PETROLEUM INDRY  |BLOW-DOWN SYSTM  |W/O CONTROLS     |1000 BARRELS REFINERY CAPACITY
3 06 005 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |PROCESS DRAINS   |GEN W/CONTROL    |1000 BARRELS WASTE WATER
3 06 005 02 INDUSTRIAL PROCES|PETROLEUM INDRY  |PROCESS DRAINS   |GEN W/O CONTROL  |1000 BARRELS WASTE WATER
3 06 006 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |VACUUM JETS      |W/CONTROL        |1000 BARRELS VACUUM DISTILLATION
3 06 006 02 INDUSTRIAL PROCES|PETROLEUM INDRY  |VACUUM JETS      |W/O CONTROL      |1000 BARRELS VACUUM DISTILLATION
3 06 007 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |COOLING TOWERS   |                 |MILLION GALLONS COOLING WATER
3 06 008 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |MISCELLANEOUS    |PIPE/VALVE-FLANGE|1000 BARRELS REFINERY CAPACITY
3 06 008 02 INDUSTRIAL PROCES|PETROLEUM INDRY  |MISCELLANEOUS    |VESL RELIEF VALVE|1000 BARRELS REFINERY CAPACITY
3 06 008 03 INDUSTRIAL PROCES|PETROLEUM INDRY  |MISCELLANEOUS    |PUMP SEALS       |1000 BARRELS REFINERY CAPACITY
3 06 008 04 INDUSTRIAL PROCES|PETROLEUM INDRY  |MISCELLANEOUS    |COMPRESR SEALS   |1000 BARRELS REFINERY CAPACITY
3 06 008 05 INDUSTRIAL PROCES|PETROLEUM INDRY  |MISCELLANEOUS    |OTHER-GENL       |1000 BARRELS REFINERY CAPACITY
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
  SCC ID                               SCC CATEGORY NAMES
  ******                               ******************
I II III IV          I                 II                III               IV                   UNITS

3 06 009 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |FLARES           |NATURAL GAS      |MILLIONS OF CUBIC FEET
3 06 009 99 INDUSTRIAL PROCES|PETROLEUM INDRY  |FLARES           |OTHER/NOT CLASIFD|MILLIONS OF CUBIC FEET
3 06 010 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |SLUDGE CONVERTER |GENERAL          |TONS PROCESSED
3 06 011 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |ASPHALT OXIDIZER |GENERAL          |TONS PROCESSED
3 06 011 99 INDUSTRIAL PROCES|PETROLEUM INDRY  |ASPHALT OXIDIZER |OTHER/NOT CLASIFD|TONS PROCESSED
3 06 012 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |FLUID COKING     |GENERAL          |1000 BARRELS FRESH FEED
3 06 999 98 INDUSTRIAL PROCES|PETROLEUM INDRY  |OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS PROCESSED
3 06 999 99 INDUSTRIAL PROCES|PETROLEUM INDRY  |OTHER/NOT CLASIFD|SPECIFY IN REMARK|BARRELS-PROCESSED
3 07 001 01 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |BLOWTNK ACCUMULTR|AIR-DRY TONS UNBLEACHED PULP
3 07 001 02 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |WASHRS/SCREENS   |AIR-DRY TONS UNBLEACHED PULP
3 07 001 03 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |MULT-EFFECT EVAP |AIR-DRY TONS UNBLEACHED PULP
3 07 001 04 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |RECVY BOLR/DCEVAP|AIR-DRY TONS UNBLEACHED PULP
3 07 001 05 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |SMELT DISSOLV TNK|AIR-DRY TONS UNBLEACHED PULP
3 07 001 06 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |LIME KILNS       |AIR-DRY TONS UNBLEACHED PULP
3 07 001 07 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |TURPENTINE CONDSR|AIR-DRY TONS UNBLEACHED PULP
3 07 001 08 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |FLUIDBED CALCINER|AIR-DRY TONS UNBLEACHED PULP
3 07 001 09 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPING  |LIQUOR OXIDN TOWR|AIR-DRY TONS UNBLEACHED PULP
3 07 001 99 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPING  |OTHER/NOT CLASIFD|AIR-DRY TONS UNBLEACHED PULP
3 07 002 01 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFITE PULPING  |LIQUOR RECOVERY  |AIR-DRY TONS UNBLEACHED PULP
3 07 002 02 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFITE PULPING  |SULFITE TOWER    |AIR-DRY TONS UNBLEACHED PULP
3 07 002 03 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFITE PULPING  |DIGESTER         |AIR-DRY TONS UNBLEACHED PULP
3 07 002 04 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFITE PULPING  |SMELT TANK       |AIR-DRY TONS UNBLEACHED PULP
3 07 002 05 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFITE PULPING  |EVAPORATORS      |AIR-DRY TONS UNBLEACHED PULP
3 07 002 06 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFITE PULPING  |PULP DIGESTER    |TONS AIR DRY PULP
3 07 002 99 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFITE PULPING  |OTHER/NOT CLASIFD|TONS AIR DRY PULP
3 07 004 01 INDUSTRIAL PROCES|WOOD PRODUCTS    |PULPBOARD MFG    |PAPERBOARD-GEN   |TONS FINISHED PRODUCT
3 07 004 02 INDUSTRIAL PROCES|WOOD PRODUCTS    |PULPBOARD MFG    |FIBERBOARD-GEN   |TONS FINISHED PRODUCT
3 07 004 99 INDUSTRIAL PROCES|WOOD PRODUCTS    |PULPBOARD MFG    |OTHER/NOT CLASIFD|TONS FINISHED PRODUCT
3 07 005 01 INDUSTRIAL PROCES|WOOD PRODUCTS    |PRESSURE TREATING|CREOSOTE         |TONS OF WOOD TREATED
3 07 005 99 INDUSTRIAL PROCES|WOOD PRODUCTS    |PRESSURE TREATING|OTHER/NOT CLASIFD|TONS OF WOOD TREATED
3 07 006 01 INDUSTRIAL PROCES|WOOD PRODUCTS    |TALLOIL/ROSIN    |GENERAL          |TONS OF PRODUCT
3 07 007 01 INDUSTRIAL PROCES|WOOD PRODUCTS    |PLYWOOD/PARTBOARD|VENEER DRYER     |TONS PROCESSED
3 07 007 02 INDUSTRIAL PROCES|WOOD PRODUCTS    |PLYWOOD/PARTBOARD|SANDING          |TONS PROCESSED
3 07 007 99 INDUSTRIAL PROCES|WOOD PRODUCTS    |PLYWOOD/PARTBOARD|OTHER/NOT CLASIFD|TONS PROCESSED
3 07 008 99 INDUSTRIAL PROCES|WOOD PRODUCTS    |SAWMILL OPERATNS |OTHER/NOT CLASIFD|TONS PROCESSED
3 07 009 99 INDUSTRIAL PROCES|WOOD PRODUCTS    |EXCELSIOR MFG    |OTHER/NOT CLASIFD|TONS PROCESSED
3 07 010 99 INDUSTRIAL PROCES|WOOD PRODUCTS    |CORK PROCESSING  |OTHER/NOT CLASIFD|TONS PROCESSED
3 07 020 99 INDUSTRIAL PROCES|WOOD PRODUCTS    |FURNITURE MFG    |OTHER/NOT CLASIFD|TONS PROCESSED
3 07 999 99 INDUSTRIAL PROCES|WOOD PRODUCTS    |OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS PROCESSED
3 09 001 01 INDUSTRIAL PROCES|METAL FABRICATION|IRON/STEEL       |MISC HARDWARE    |TONS OF PRODUCT
3 09 001 02 INDUSTRIAL PROCES|METAL FABRICATION|IRON/STEEL       |FARM MACHINERY   |TONS OF PRODUCT
3 09 001 99 INDUSTRIAL PROCES|METAL FABRICATION|IRON/STEEL       |OTHER/NOT CLASIFD|TONS PROCESSED
3 09 010 99 INDUSTRIAL PROCES|METAL FABRICATION|PLATING OPERATONS|OTHER/NOT CLASIFD|TONS PLATED
3 09 020 99 INDUSTRIAL PROCES|METAL FABRICATION|CAN MAKING OPRNS |OTHER/NOT CLASIFD|TONS PRODUCT
3 09 999 99 INDUSTRIAL PROCES|METAL FABRICATION|OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS PROCESSE
3 20 999 99 INDUSTRIAL PROCES|LEATHER PRODUCTS |OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS PROCESSED
3 30 001 01 INDUSTRIAL PROCES|TEXTILE MFG      |GENERAL FABRICS  |YARN PREP/BLEACH |TONS PROCESSED
3 30 001 99 INDUSTRIAL PROCES|TEXTILE MFG      |GENERAL FABRICS  |OTHER/NOT SPECIFD|TONS PROCESSED
3 30 002 99 INDUSTRIAL PROCES|TEXTILE MFG      |RUBERIZED FABRICS|OTHER/NOT SPECIFD|TONS PROCESSED
3 30 003 99 INDUSTRIAL PROCES|TEXTILE MFG      |CARPET OPERATNS  |OTHER/NOT SPECIFD|TONS PROCESSED
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
  SCC  ID                                     SCC CATEGORY NAMES
  ******                                    ******************
I II III IV          I                      II                   III                  IV                  UNITS

3 90 001 99 INDUSTRIAL PROCES|INPROCESS FUEL    |ANTHRACITE COAL  |OTHER/NOT CLASIFD|TONS BURNED
3 90 002 01 INDUSTRIAL PROCES|INPROCESS FUEL    |BITUMINOUS COAL  |CEMENT KILN      |TONS BURNED
3 90 002 06 INDUSTRIAL PROCES|INPROCESS FUEL    |BITUMINOUS COAL  |BRICK KILN/DRY   |TONS BURNED
3 90 002 07 INDUSTRIAL PROCES|INPROCESS FUEL    |BITUMINOUS COAL  |GYPSUM KILN/ETC  |TONS BURNED
3 90 002 08 INDUSTRIAL PROCES|INPROCESS FUEL    |BITUMINOUS COAL  |COAL DRYERS      |TONS BURNED
3 90 002 99 INDUSTRIAL PROCES|INPROCESS FUEL    |BITUMINOUS COAL  |OTHER/NOT CLASIFD|TONS BURNED
3 90 004 01 INDUSTRIAL PROCES|INPROCESS FUEL    |RESIDUAL OIL     |ASPHALT DRYER    |1000 GALLONS BURNED
3 90 004 02 INDUSTRIAL PROCES|INPROCESS FUEL    |RESIDUAL OIL     |CEMENT KILN      |1000 GALLONS BURNED
3 90 004 03 INDUSTRIAL PROCES|INPROCESS FUEL    |RESIDUAL OIL     |LIME KILN        |1000 GALLONS BURNED
3 90 004 04 INDUSTRIAL PROCES|INPROCESS FUEL    |RESIDUAL OIL     |KAOLIN KILN      |1000 GALLONS BURNED
3 90 004 05 INDUSTRIAL PROCES|INPROCESS FUEL    |RESIDUAL OIL     |METAL MELTING    |1000 GALLONS BURNED
3 90 004 06 INDUSTRIAL PROCES|INPROCESS FUEL    |RESIDUAL OIL     |BRICK KILN/DRY   |1000 GALLONS BURNED
3 90 004 07 INDUSTRIAL PROCES|INPROCESS FUEL    |RESIDUAL OIL     |GYPSUM KILN/ETC  |1000 GALLONS BURNED
3 90 004 99 INDUSTRIAL PROCES|INPROCESS FUEL    |RESIDUAL OIL     |OTHER/NOT CLASIFD|1000 GALLONS BURNED
3 90 005 01 INDUSTRIAL PROCES|INPROCESS FUEL    |DISTILLATE OIL   |ASPHALT DRYER    |1000 GALLONS BURNED
3 90 005 02 INDUSTRIAL PROCES|INPROCESS FUEL    |DISTILLATE OIL   |CEMENT KILN      |1000 GALLONS BURNED
3 90 005 03 INDUSTRIAL PROCES|INPROCESS FUEL    |DISTILLATE OIL   |LIME KILN        |1000 GALLONS BURNED
3 90 005 04 INDUSTRIAL PROCES|INPROCESS FUEL    |DISTILLATE OIL   |KAOLIN KILN      |1000 GALLONS BURNED
3 90 005 05 INDUSTRIAL PROCES|INPROCESS FUEL    |DISTILLATE OIL   |METAL MELTING    |1000 GALLONS BURNED
3 90 005 06 INDUSTRIAL PROCES|INPROCESS FUEL    |DISTILLATE OIL   |BRICK KILN/DRY   |1000 GALLONS BURNED
3 90 005 07 INDUSTRIAL PROCES|INPROCESS FUEL    |DISTILLATE OIL   |GYPSUM KILN/ETC  |1000 GALLONS BURNED
3 90 005 99 INDUSTRIAL PROCES|INPROCESS FUEL    |DISTILLATE OIL   |OTHER/NOT CLASIFD|1000 GALLONS BURNED
3 90 006 01 INDUSTRIAL PROCES|INPROCESS FUEL    |NATURAL GAS      |ASPHALT DRYER    |MILLION CUBIC FEET BURNED
3 90 006 02 INDUSTRIAL PROCES|INPROCESS FUEL    |NATURAL GAS      |CEMENT KILN      |MILLION CUBIC FEET BURNED
3 90 006 03 INDUSTRIAL PROCES|INPROCESS FUEL    |NATURAL GAS      |LIME KILN        |MILLION CUBIC FEET BURNED
3 90 006 04 INDUSTRIAL PROCES|INPROCESS FUEL    |NATURAL GAS      |KAOLIN KILN      |MILLION CUBIC FEET BURNED
3 90 006 05 INDUSTRIAL PROCES|INPROCESS FUEL    |NATURAL GAS      |METAL MELTING    |MILLION CUBIC FEET BURNED
3 90 006 06 INDUSTRIAL PROCES|INPROCESS FUEL    |NATURAL GAS      |BRICK KILN/DRYS  |MILLION CUBIC FEET BURNED
3 90 006 07 INDUSTRIAL PROCES|INPROCESS FUEL    |NATURAL GAS      |GYPSUM KILN ETC  |MILLION CUBIC FEET BURNED
3 90 006 99 INDUSTRIAL PROCES|INPROCESS FUEL    |NATURAL GAS      |OTHER/NOT CLASIFD|MILLION CUBIC FEET BURNED
3 90 007 99 INDUSTRIAL PROCES|INPROCESS FUEL    |PROCESS GAS      |OTHER/NOT CLASIFD|MILLION CUBIC FEET BURNED
3 90 008 99 INDUSTRIAL PROCES|INPROCESS FUEL    |COKE             |OTHER/NOT CLASIFD|TONS
3 90 009 99 INDUSTRIAL PROCES|INPROCESS FUEL    |WOOD             |OTHER/NOT CLASIFD|TONS BURNED
3 90 999 97 INDUSTRIAL PROCES|INPROCESS FUEL    |OTHER/NOT CLASIFD|SPECIFY IN REMARK|MILLION CUBIC FEET BURNED
3 90 999 98 INDUSTRIAL PROCES|INPROCESS FUEL    |OTHER/NOT CLASIFD|SPECIFY IN REMARK|1000 GALLONS BURNED
3 90 999 99 INDUSTRIAL PROCES|INPROCESS FUEL    |OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS BURNED
3 99 999 99 INDUSTRIAL PROCES|OTHER/NOT CLASIFD|SPECIFY IN REMARK|                 |TONS PROCESSED
4 01 001 01 POINT SC EVAP    |CLEANING SOLVENT |DRYCLEANING      |PERCHLORETHYLENE |TONS CLOTHES CLEANED
4 01 001 02 POINT SC EVAP    |CLEANING SOLVENT |DRYCLEANING      |STODDARD         |TONS CLOTHES CLEANED
4 01 002 01 POINT SC EVAP    |CLEANING SOLVENT |DEGREASING       |STODDARD         |TONS SOLVENT USED
4 01 002 99 POINT SC EVAP    |CLEANING SOLVENT |DEGREASING       |OTHER/NOT CLASIFD|TONS SOLVENT USED
4 01 999 99 POINT SC EVAP    |CLEANING SOLVENT |OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS SOLVENT USED
4 02 001 01 POINT SC EVAP    |SURFACE COATING  |PAINT            |GENERAL          |TONS COATING
4 02 003 01 POINT SC EVAP    |SURFACE COATING  |VARNISH/SHELLAC  |GENERAL          |TONS COATING
4 02 004 01 POINT SC EVAP    |SURFACE COATING  |LAQUER           |GENERAL          |TONS COATING
4 02 005 01 POINT SC EVAP    |SURFACE COATING  |ENAMEL           |GENERAL          |TONS COATING
4 02 006 01 POINT SC EVAP    |SURFACE COATING  |PRIMER           |GENERAL          |TONS COATING
4 02 999 99 POINT SC EVAP    |SURFACE COATING  |OTHER/NOT CLASIFD|SPECIFY IN REMARK|TONS COATING
4 03 001 01 POINT SC EVAP    |PETROLEUM STG    |FIXED ROOF       |BREATHING-PRODUCT|1000 GALLONS STORAGE CAPACITY
4 03 001 02 POINT SC EVAP    |PETROLEUM STG    |FIXED ROOF       |BREATHING CRUDE  |1000 GALLONS STORAGE CAPACITY
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
   SCC ID                                           SCC CATEGORY NAMES
   ******                                          *******************
I II III IV          I                    II                 III                IV                   UNITS

4 03 001 03 POINT SC EVAP        IPETROLEUM STG    IFIXED ROOF       IWORKING-PRODUCT  I1000 GALLONS THROUGHPUT
4 03 001 04 POINT SC EVAP        IPETROLEUM STG    IFIXED ROOF       IWORKING CRUDE    I1000 GALLONS THROUGHPUT
4 03 002 01 POINT SC EVAP        IPETROLEUM STG    IFLOATING ROOF    IBREATHING PRODUCTI1000 GALLONS STORAGE CAPACITY
4 03 002 02 POINT SC EVAP        IPETROLEUM STG    IFLOATING ROOF    IWORKING-PRODUCT  I1000 GALLONS THROUGHPUT
4 03 002 03 POINT SC EVAP        IPETROLEUM STG    IFLOATING ROOF    IBREATHING-CRUDE  I1000 GALLONS STORAGE CAPACITY
4 03 002 04 POINT SC EVAP        IPETROLEUM STG    IFLOATING ROOF    IWORKING-CRUDE    I1000 GALLONS THROUGHPUT
4 03 999 99 POINT SC EVAP        IPETROLEUM STG    IOTHER/NOT CLASIFDISPECIFY IN REMARKI1000 GAL STORED
4 04 001 99 POINT SC EVAP        IMISC ORGANIC STORIOTHER/NOT CLASIFDISPECIFY IN REMARKITONS STORED
4 05 001 01 POINT SC EVAP        IPRINTING PRESS   IDRYERS           IGENERAL          ITONS SOLVENT
4 90 999 99 POINT SC EVAP        IMISC HC EVAP     IOTHER/NOT CLASIFDISPECIFY IN REMARKITONS PROCESSED
5 01 001 01 SOLID WASTE          IGOVERNMENT       IMUNICIPAL INCIN  IMULTIPLE CHAMBER ITONS BURNED
5 01 001 02 SOLID WASTE          IGOVERNMENT       IMUNICIPAL INCIN  ISINGLE CHAMBER   ITONS BURNED
5 01 002 01 SOLID WASTE          IGOVERNMENT       IOPEN BURNING DUMPIGENERAL          ITONS BURNED
5 01 002 02 SOLID WASTE          IGOVERNMENT       IOPEN BURNING DUMPILANDSCAPE/PRUNINGITONS BURNED
5 01 002 03 SOLID WASTE          IGOVERNMENT       IOPEN BURNING DUMPIJET FUEL         IHUNDREDS OF GALLONS
5 01 005 05 SOLID WASTE          IGOVERNMENT       IINCINERATOR      IPATHOLOGICAL     ITONS BURNED
5 01 005 06 SOLID WASTE          IGOVERNMENT       IINCINERATOR      ISLUDGE           ITONS DRY SLUDGE
5 01 005 07 SOLID WASTE          IGOVERNMENT       IINCINERATOR      ICONICAL          ITONS BURNED
5 01 005 99 SOLID WASTE          IGOVERNMENT       IINCINERATOR      IOTHER/NOT CLASIFDITONS BURNED
5 01 900 04 SOLID WASTE          IGOVERNMENT       IAUX.FUEL/NO EMSNSIRESIDUAL OIL     I1000 GALLONS
5 01 900 05 SOLID WASTE          IGOVERNMENT       IAUX.FUEL/NO EMSNSIDISTILLATE OIL   I1000 GALLONS
5 01 900 06 SOLID WASTE          IGOVERNMENT       IAUX.FUEL/NO EMSNSINATURAL GAS      IMILLION CUBIC FEET
5 01 900 10 SOLID WASTE          IGOVERNMENT       IAUX.FUEL/NO EMSNSILPG              I1000 GALLONS
5 01 900 97 SOLID WASTE          IGOVERNMENT       IAUX.FUEL/NO EMSNSIOTHER/NOT CLASIFDIMILLION CUBIC FEET
5 01 900 98 SOLID WASTE          IGOVERNMENT       IAUX.FUEL/NO EMSNSIOTHER/NOT CLASIFDI1000 GALLONS
5 01 900 99 SOLID WASTE          IGOVERNMENT       IAUX.FUEL/NO EMSNSIOTHER/NOT CLASIFDITONS
5 02 001 01 SOLID WASTE          ICOMM-INST        IINCINERATOR GEN  IMULTIPLE CHAMBER ITONS BURNED
5 02 001 02 SOLID WASTE          ICOMM-INST        IINCINERATOR GEN  ISINGLE CHAMBER   ITONS BURNED
5 02 001 03 SOLID WASTE          ICOMM-INST        IINCINERATOR GEN  ICONTROLLED AIR   ITONS BURNED
5 02 001 04 SOLID WASTE          ICOMM-INST        IINCINERATOR GEN  ICONICAL FEFUSE   ITONS BURNED
5 02 001 05 SOLID WASTE          ICOMM-INST        IINCINERATOR GEN  ICONICAL WOOD     ITONS BURNED
5 02 002 01 SOLID WASTE          ICOMM-INST        IOPEN BURNING     IWOOD             ITONS BURNED
5 02 003 01 SOLID WASTE          ICOMM-INST        IAPARTMENT INCIN  IFLUE FED         ITONS BURNED
5 02 003 02 SOLID WASTE          ICOMM-INST        IAPARTMENT INCIN  IFLUE FED-MODIFIEDITONS BURNED
5 02 005 05 SOLID WASTE          ICOMM-INST        IINCINERATOR      IPATHOLOGICAL     ITONS BURNED
5 02 005 06 SOLID WASTE          ICOMM-INST        IINCINERATOR      ISLUDGE           ITONS DRY SLUDGE
5 02 005 99 SOLID WASTE          ICOMM-INST        IINCINERATOR      IOTHER/NOT CLASIFDITONS BURNED
5 02 900 04 SOLID WASTE          ICOMM-INST        IAUX.FUEL/NO EMSNSIRESIDUAL OIL     I1000 GALLONS
5 02 900 05 SOLID WASTE          ICOMM-INST        IAUX.FUEL/NO EMSNSIDISTILLATE OIL   I1000 GALLONS
5 02 900 06 SOLID WASTE          ICOMM-INST        IAUX.FUEL/NO EMSNSINATURAL GAS      IMILLION CUBIC FEET
5 02 900 10 SOLID WASTE          ICOMM-INST        IAUX.FUEL/NO EMSNSILPG              I1000 GALLONS
5 02 900 97 SOLID WASTE          ICOMM-INST        IAUX.FUEL/NO EMSNSIOTHER/NOT CLASIFDIMILLION CUBIC FEET
5 02 900 98 SOLID WASTE          ICOMM-INST        IAUX.FUEL/NO EMSNSIOTHER/NOT CLASIFDI1000 GALLONS
5 02 900 99 SOLID WASTE          ICOMM-INST        IAUX.FUEL/NO EMSNSIOTHER/NOT CLASIFDITONS
5 03 001 01 SOLID WASTE          IINDUSTRIAL       IINCINERATOR      IMULTIPLE CHAMBER ITONS BURNED
5 03 001 02 SOLID WASTE          IINDUSTRIAL       IINCINERATOR      ISINGLE CHAMBER   ITONS BURNED
5 03 001 03 SOLID WASTE          IINDUSTRIAL       IINCINERATOR      ICONTROLLED AIR   ITONS BURNED
5 03 001 04 SOLID WASTE          IINDUSTRIAL       IINCINERATOR      ICONICAL REFUSE   ITONS BURNED
5 03 001 05 SOLID WASTE          IINDUSTRIAL       IINCINERATOR      ICONICAL WOOD     ITONS BURNED
5 03 001 06 SOLID WASTE          IINDUSTRIAL       IINCINERATOR      IOPEN PIT         ITONS OF WASTE
```

NATIONAL EMISSIONS DATA SYSTEM (NEDS)
SOURCE CLASSIFICATION CODE (SCC) REPORT

```
   SCC ID                             SCC CATEGORY NAMES
   ******                             ******************
I II III IV          I               II                  III                IV                   UNITS

5 03 002 01 SOLID WASTE        IINDUSTRIAL        IOPEN BURNING      IWOOD              ITONS BURNED
5 03 002 02 SOLID WASTE        IINDUSTRIAL        IOPEN BURNING      IREFUSE            ITONS BURNED
5 03 002 03 SOLID WASTE        IINDUSTRIAL        IOPEN BURNING      IAUTO BODY COMPTS  ITONS BURNED
5 03 003 01 SOLID WASTE        IINDUSTRIAL        IAUTO BODY INCINATIW/O AFTERBURNER    IAUTOS BURNED
5 03 003 02 SOLID WASTE        IINDUSTRIAL        IAUTO BODY INCINATIW/ AFTERBURNER     IAUTOS BURNED
5 03 004 01 SOLID WASTE        IINDUSTRIAL        IRAIL CAR BURNING IOPEN               ICARS BURNED
5 03 005 06 SOLID WASTE        IINDUSTRIAL        IINCINERATOR       ISLUDGE            ITONS DRY SLUDGE
5 03 005 99 SOLID WASTE        IINDUSTRIAL        IINCINERATOR       IOTHER/NOT CLASIFDITONS BURNED
5 03 900 04 SOLID WASTE        IINDUSTRIAL        IAUX.FUEL/NO EMSNSIRESIDUAL OIL      I1000 GALLONS
5 03 900 05 SOLID WASTE        IINDUSTRIAL        IAUX.FUEL/NO EMSNSIDISTILLATE OIL    I1000 GALLONS
5 03 900 06 SOLID WASTE        IINDUSTRIAL        IAUX.FUEL/NO EMSNSINATURAL GAS       IMILLION CUBIC FEET
5 03 900 07 SOLID WASTE        IINDUSTRIAL        IAUX.FUEL/NO EMSNSIPROCESS GAS       IMILLION CUBIC FEET
5 03 900 10 SOLID WASTE        IINDUSTRIAL        IAUX.FUEL/NO EMSNSIL P G             I1000 GALLONS
5 03 900 97 SOLID WASTE        IINDUSTRIAL        IAUX.FUEL/NO EMSNSIOTHER/NOT CLASIFDIMILLION CUBIC FEET
5 03 900 98 SOLID WASTE        IINDUSTRIAL        IAUX.FUEL/NO EMSNSIOTHER/NOT CLASIFDI1000 GALLONS
5 03 900 99 SOLID WASTE        IINDUSTRIAL        IAUX.FUEL/NO EMSNSIOTHER/NOT CLASIFDITONS
```

A.3 CONTROL EQUIPMENT IDENTIFICATION CODES

Identification Number	Control Device/Method
000	No Equipment
001	Wet Scrubber - High Efficiency
002	Wet Scrubber - Medium Efficiency
003	Wet Scrubber - Low Efficiency
004	Gravity Collector - High Efficiency
005	Gravity Collector - Medium Efficiency
006	Gravity Collector - Low Efficiency
007	Centrifugal Collector - High Efficiency
008	Centrifugal Collector - Medium Efficiency
009	Centrifugal Collector - Low Efficiency
010	Electrostatic Precipitator - High Efficiency
011	Electrostatic Precipitator - Medium Efficiency
012	Electrostatic Precipitator - Low Efficiency
013	Gas Scrubber (general, not classified)
014	Mist Eliminator - High Velocity
015	Mist Eliminator - Low Velocity
016	Fabric Filter - High Temperature
017	Fabric Filter - Medium Temperature
018	Fabric Filter - Low Temperature
019	Catalytic Afterburner
020	Catalytic Afterburner with Heat Exchanger
021	Direct Flame Afterburner
022	Direct Flame Afterburner with Heat Exchanger
023	Flaring
039	Catalytic Oxidation - Flue Gas Desulfurization
040	Alkalized Alumina
041	Dry Limestone Injection
042	Wet Limestone Injection
043	Sulfuric Acid Plant - Contact Process
044	Sulfuric Acid Plant - Double Contact Process
045	Sulfur Plant
046	Process Change
047	Vapor Recovery System (including condensers, hooding, and other enclosures)
048	Activated Carbon Adsorption
049	Liquid Filtration System
050	Packed-Gas Absorption Column
051	Tray-Type Gas Absorption Column

Identification Number:	Control Device/Method:
052	Spray Tower (Gaseous Control Only)
053	Venturi Scrubber (Gaseous Control Only)

For the particulate control devices (wet scrubbers, gravity collectors, centrifugal collectors, and electrostatic precipitators), the efficiency ranges correspond to the following percentages:

High:	95 - 99 +
Medium:	80 - 95
Low:	<80

A.4 IPP PROCESS IDENTIFICATION CODES

Process	Code	
Flour and other Grain Mill Products	2041	
Combustion		X*0
General		01
Wheat		02
Barley		03
Prepared Feeds for Animals and Fowls	2042	
Combustion		X0
General		01
Alfalfa		02
Roasted Coffee	2095	
Combustion		X0
Direct-Fired		01
Indirect-Fired		02
Stones and Cooler		03
Spray Cooler		04
Kraft Pulp Mills	2621	
Combustion		X0
Digester Blow System		01
Smelt Tank		02
Lime Kiln		03
Recovery Furnace		04

---

* For value of X, see following list for combustion code numbers.

Process	Code	
Kraft Pulp Mills	2621	
Multiple Effect Evaporator		05
Oxidation Tower		06
Industrial Inorganic Chemicals	2819	
Combustion		X0
Sulfur Recovery Incinerator		01
Sulfuric Acid		02
Nitric Acid		03
Ammonium Nitrate		04
Hydrofluoricacid		05
Calcium Carbide - Coke Dryer		06
Calcium Carbide - Electric Furnace Hood		07
Calcium Carbide - Electric Furnace Vents		08
Calcium Carbide Stack		09
Calcium Carbide Calcination		11
Phosphoric Acid		12
Inorganic Pigments	2816	
Combustion		X0
Calcination		01
Digestion		02
Chloride Process		03
Chloride Coke or Ore Drying		04
Ore Grinding		05
Titanium Oxide Ore Drying		06
Varnish Reaction Kettles		07
Paints, Varnishes, Lacquers, Enamels, and Allied Products	2851	
Combustion		X0
Varnish Cookers		01
Alkyd Resin		02
Cooking and Blowing		03

Process	Code
Paints, Varnishes, Lacquers, Enamels, and Allied Products	2851
Polymerization	04
Petroleum Refining	2911
Combustion	X0
Fluid Catalytic Units	01
Moving Bed Catalytic Units	02
Sulfur Recovery	03
Acid Refining of Lube Oils	04
Microfines Unit	05
Calciner Kiln	06
Fluid Cooker	07
Process Emission Source	08
Asphalt Batching	2951
Combustion	X0
Batching	01
Quarrying	02
Rock Drying	03
Sheet Rock Cutting and Trimming	04
Cement Manufacturing	3241
Combustion	X0
Dry Process	01
Wet Process	02
Sand Dryer	03
Lime Production	3274
Combustion	X0
Rotary Kiln	01
Vertical Kiln	02
Minerals and Earths, Treated	3295
Combustion	X0
Crushing	01

Process	Code	
Minerals and Earths, Treated	3295	
Conveying, Screening, and Shaking		02
Storage Piles		03
Iron and Steel Mills	3312	
Combustion		X0
Blast Furnace		01
Basic Oxygen Furnace		02
Sintering		03
Coking Operations		04
Electric Arc Furnace		05
Open Hearth Furnace		06
Bessemer		07
Scarfing		08
Gray Iron Foundries	3321	
Combustion		X0
Cupola		01
Electric Induction		02
Reverberatory Furnace		03
Steel Foundries	3323	
Combustion		X0
Electric Arc		01
Electric Induction		02
Open Hearth		03
Primary Smelting and Refining of Lead	3332	
Combustion		X0
Sintering		01
Blast Furnace		02
Reverberatory Furnace		03
Refining of Lead		04
Lead Oxide Manufacturing		05

Process	Code
Secondary Smelting and Refining of Non-Ferrous Metals	3341
Combustion	X0
Aluminum - Chlorination Station	01
Aluminum - Crucible Furnace	02
Aluminum - Reverberatory Furnace	03
Aluminum - Sweating Furnace	04
General Aluminum Operations	05
Brass and Bronze - Crucible Furnace	06
Brass and Bronze - Electric Furnace	07
Brass and Bronze - Reverberatory Furnace	08
Brass and Bronze - Rotary Furnace	09
Non-Ferrous Castings	3369
Combustion	X0
Lead - Cupola	01
Lead Pot Furnace	02
Lead - Reverberatory and Sweating	03
Zinc - Galvanizing Kettles	04
Zinc - Calcine Kilns	05
Zinc - Pot Furnace	06
Zinc - Sweating Furnace	07
Zinc - Distillation Furnace	08
Refuse Systems	4953
Combustion of fuel	X0
Municipal Incinerator	01
Open Burning	02
On-site Multichamber Incinerator	03
On-site Single Multichamber Incinerator	04
Flue Fed Incinerator	05
Other	06

COMBUSTION CODE NUMBERS

All not listed	[illegible]
Pulverized, general	10
Pulverized, dry bottom	[illegible]
Pulverized, wet bottom without flyash reinjection	[illegible]
Pulverized, wet bottom with flyash reinjection	[illegible]
Cyclone	[illegible]
Spreader stoker without flyash reinjection	[illegible]
Spreader stoker with flyash reinjection	[illegible]
All other stokers	[illegible]
Hand-fired	[illegible]

A.5 TRACE ELEMENTS AND COMPOUNDS IDENTIFICATION CODES

Pollutant	Code
Total Element (Free and Combined)	121
Aluminum	12101
Antimony	12102
Arsenic	12103
Argon	12104
Asbestos	12552
Beryllium	12105
Bismuth	12106
Barium	12107
Boron	12108
Bromine	12109
Cadmium	12110
Calcium	12111
Chromium	12112
Cobalt	12113
Copper	12114
Chlorine	12115

Pollutant	Code
Carbon	12116
Cerium	12117
Cesium	12118
Dysprosium	12119
Erbium	12120
Europium	12121
Fluorine	12122
Gadolinium	12123
Gallium	12124
Germanium	12125
Iron	12126
Hafnium	12127
Lead	12128
Holmium	12129
Hydrogen	12130
Indium	12131
Manganese	12132
Iridium	12133
Molybdenum	12134
Krypton	12135
Nickel	12136
Helium	12137
Lithium	12138
Lutetium	12139
Magnesium	12140
Iodine	12141
Mercury	12142
Gold	12143
Neodymium	12144
Neon	12145

Pollutant	Code
Lanthanum	12146
Niobium	12147
Nitrogen	12148
Osmium	12149
Oxygen	12150
Palladium	12151
Phosphorus	12152
Platinum	12153
Selenium	12154
Praseodymium	12155
Protectinium	12156
Radium	12157
Rhenium	12158
Rhodium	12159
Tin	12160
Titanium	12161
Samarium	12162
Scandium	12163
Vanadium	12164
Silicon	12165
Silver	12166
Zinc	12167
Strontium	12168
Sulfur	12169
Tantalum	12170
Tellurium	12171
Terbium	12172
Thallium	12173
Thorium	12174

Pollutant	Code
Thulium	12175
Rubidium	12176
Ruthenium	12177
Tungsten	12178
Uranium	12179
Potassium	12180
Xenon	12181
Ytterbium	12182
Yttrium	12183
Sodium	12184
Zirconium	12185
Group VII Compounds and Ions	122
Bromide ion	12201
Fluoride ion	12202
Chloride ion	12203
Iodide ion	12204
Chlorate ion	12205
Perchlorate ion	12206
Bromate ion	12207
Sodium chloride	12210
Potassium chloride	12211
Calcium chloride	12212
Ammonium chloride	12213
Aluminum chloride	12214
Sodium bromide	12230
Potassium bromide	12231
Sodium iodide	12250
Potassium iodide	12251
Potassium fluoride	12270

Pollutant	Code
Sodium fluoride	12271
Sodium fluorosilicate	12275
Calcium fluorosilicate	12276
Group IV Compounds and Ions	125
Silicate ion	12550
Silicon dioxide	12551
Acids and bases	126
Total acidity H^+	12601
Hydrogen ion concentration pH	12602
Bicarbonate ion	12603
Sulfuric acid	12604
Nitric acid	12605
Hydrochloric acid	12606
Total alkalinity	12650
Hydroxide ion concentration	12651
Carbonate ion	12652
Organo-Metallic Compounds and Ions	127
Miscellaneous	128

APPENDIX B

COMPREHENSIVE EMISSION INVENTORY CARD FORMATS

B.1 POINT SOURCE CARD FORMAT

Plant Identification Data Card

Card Column	Format	Parameter
1 - 2	XX	State Code
3 - 6	XXXX	County Code
7 - 9	XXX	AQCR Code
10 - 13	XXXX	Plant ID Number*
14 - 17	XXXX	City Code
18 - 19	XX	UTM Zone
20 - 21	XX	Year of Record**
22 - 36	A---A	Establishment Name
37 - 61	A---A	Establishment Address
62 - 73	A---A	Contracts (Personal)
74	A	Ownership***
78	X	Action Code
79	P	Point Source Code
80	1	Point Source Card Code

---

* This number is unique within county identification

** For each Point Source Card (1, 2, 3, 4, 5 or 6) the Year of Record refers only to the data on that card

*** P = Private
L = Local
S = State government
F = Federal government
U = Utilities

General Identification and Stack Data Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	
3 - 6	XXXX	County Code	
7 - 9	XXX	AQCR Code	
10 - 13	XXXX	Plant ID Number	
14 - 15	XX	Point ID Number in Plant	
16 - 17	XX	Year of Record	
18 - 21	XXXX	SIC Code	
22 - 23	XX	Process Code (IPP)	
24 - 27	XXXX.X	UTM Horizontal Coordinate	km
28 - 32	XXXX.X	UTM Vertical Coordinate	km
33 - 36	XXXX	Stack Height	ft
37 - 39	XX.X	Stack Inside Equivalent Diameter, At Top	ft
40 - 43	XXXX	Stack Gas Temperature	°F
44 - 50	XXXXXXX	Stack Gas Flow Rate	Actual ft^3/min
51 - 54	XXXX	Plume Height (if no stack)	ft
56 - 59	XXXX	Points with Common Stack	–
78	X	Action Code	–
79	P	Point Source Code	–
80	2	Point Source Card Code	–

Control Equipment Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	–
3 - 6	XXXX	County Code	–
7 - 9	XXX	AQCR Code	–
10 - 13	XXXX	Plant ID Number	–
14 - 15	XX	Point ID Number in Plant	–
16 - 17	XX	Year of Record	–

Card Column	Format	Parameter	Units
18 - 22	XXXXX	Total Boiler Design Capacity	10^6 Btu/hr
23 - 25	XXX	Primary Particulate Control Equipment Code	-
26 - 28	XXX	Secondary Particulate Control Equipment Code	-
29 - 31	XXX	Primary SO_2 Control Equipment Code	
32 - 34	XXX	Secondary SO_2 Control Equipment Code	-
35 - 37	XXX	Primary NO_x Control Equipment Code	-
38 - 40	XXX	Secondary NO_x Control Equipment Code	-
41 - 43	XXX	Primary HC Control Equipment Code	
44 - 46	XXX	Secondary HC Control Equipment Code	
47 - 49	XXX	Primary CO Control Equipment Code	
50 - 52	XXX	Secondary CO Control Equipment Code	
53 - 55	XX.X	Estimated Control Efficiency-Particulates	
56 - 58	XX.X	Estimated Control Efficiency-SO_2	
59 - 61	XX.X	Estimated Control Efficiency-NO_x	
62 - 64	XX.X	Estimated Control Efficiency-HC	
65 - 67	XX.X	Estimated Control Efficiency-CO	
[illegible]	X	Action Code	
79	P	Point Source Code	
[illegible]	C	Point Source Card Code	

Emission Card

Card Column	Format	Parameter	Units
1 - 2	xx	State Code	
3 - 6	xxxx	County Code	
7 - 9	xxx	AQCR Code	
10 - 13	xxxx	Plant ID Number	
14 - 15	xx	Point ID Number in Plant	
16 - 17	xx	Year of Record	
18 - 19	xx	% of annual thruput (Dec., Jan., Feb.)	
20 - 21	xx	% of annual thruput (Mar., Apr., May)	
22 - 23	xx	% of annual thruput (June, July, Aug.)	
24 - 25	xx	% of annual thruput (Sept., Oct., Nov.)	
26 - 27	xx	Normal Operation Hours	hr
28	x	Normal Operation Days	da
29 - 30	xx	Normal Operation Weeks	wk
31 - 37	xxxxxxx	Emissions Estimate - Particulate	T/yr
38 - 44	xxxxxxx	Emissions Estimate - SO_x	T/yr
45 - 51	xxxxxxx	Emissions Estimate - NO_x	T/yr
52 - 58	xxxxxxx	Emissions Estimate - HC	T/yr
59 - 65	xxxxxxx	Emissions Estimate - CO	T/yr
66	x	Method of estimating Particulate emissions*	
67	x	Method of estimating SO_x emissions*	
68	x	Method of estimating NO_x emissions*	
69	x	Method of estimating HC emissions*	

Card Column	Format	Parameter	Units
70	X	Method of estimating CO Emissions*	
71 - 73	XX.X	Portion of Fuel used for Space Heating	
78	X	Action Code	-
79	P	Point Source Code	
80	4	Point Source Card Code	

* 1 - Stack Tests
2 - Material Balance
3 - Calculated using Emission Factors
4 - Guess

Compliance Analysis Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	-
3 - 6	XXXX	County Code	-
7 - 9	XXX	AQCR Code	
10 - 13	XXXX	Plant ID Number	
14 - 15	XX	Point ID Number in Plant	
16 - 17	XX	Year of Record	
18 - 24	XXXXXXX	Allowable Emissions - Particulate	T/yr
25 - 31	XXXXXXX	Allowable Emissions - SO_2	T/yr
32 - 38	XXXXXX	Allowable Emissions - NO_x	T/yr
39 - 45	XXXXXXX	Allowable Emissions - HC	T/yr
46 - 52	XXXXXXX	Allowable Emissions - CO	T/yr
53	X	Source Compliance Status*	

* 1 - In Compliance
2 - Non Compliance, variance not given (complete date items)
3 - Non Compliance, variance given (complete date items)
4 - Compliance status not known

Card Column	Format	Parameter	Units
54 - 55	XX	Year Source must be in compliance (complete only if Compliance Status = 2, 3)	-
56 - 57	XX	Month Source must be in compliance (complete only if Compliance Status = 2, 3)	-
58 - 59	XX	Year of Compliance Status Update	-
60 - 61	XX	Month of Compliance Status Update	-
62 - 63	XX	Day of Compliance Status Update	-
78	X	Action Code	-
79	P	Point Source Code	-
80	5	Point Source Card Code	-

Operating Data Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	
3 - 6	XXXX	County Code	
7 - 9	XXX	AQCR Code	
10 - 13	XXXX	Plant ID Number	
14 - 15	XX	Point ID Number in Plant	
16 - 17	XX	Year of Record	
18 - 25	XXXXXXXX	SCC	
26 - 32	XXXXXXX	Fuel, Process, or Solid Waste Operating Rate	(SCC)*
33 - 39	XXXXXXX	Maximum Design Rate	(SCC)*
40 - 42	X.XX	Sulfur Content	
43 - 45	XX.X	Ash Content	
46 - 50	XXXXX	Heat Content	Btu/(SCC)*

---

* (SCC): Units defined by SCC category used.

Card Column	Format	Parameter	Units
51 - 70	A----A	Comments	-
71	A	Source**	-
78	X	Action Code	-
79	P	Point Source Code	-
80	6	Point Source Card Code	-

** B - Boiler
P = Industrial Process
S = Solid Waste Disposal

B.2 AREA SOURCE CARD FORMAT

Residential Fuel Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	-
3 - 6	XXXX	County Code	-
7 - 9	XXX	AQCR Code	-
10 - 11	XX	Year of Record	-
12 - 16	XXXXX	Emissions Estimate - Particulate	10^2 Tons
17 - 21	XXXXX	Emissions Estimate - SO_2	10^2 Tons
22 - 25	XXXX	Emissions Estimate - NO_x	10^2 Tons
26 - 30	XXXXX	Emissions Estimate - HC	10^2 Tons
31 - 35	XXXXX	Emissions Estimate - CO	10^2 Tons
36 - 37	X.X	Sulfur Content - Anthracite	[illegible]
38 - 39	X.X	Sulfur Content - Bituminous	[illegible]
40 - 41	X.X	Sulfur Content - Distillate Oil	[illegible]
41 - 43	X.X	Sulfur Content - Residual Oil	[illegible]
44 - 46	XX.X XX.X	Ash Content - Anthracite	[illegible]
47 - 49	XX.X	Ash Content - Bituminous	[illegible]
50 - 53	XXXX	Residential Fuel - Anthracite	10^1 Tons

Card Column	Format	Parameter	Units
54 - 58	XXXXX	Residential Fuel - Bituminous	10^1 Tons
59 - 63	XXXXX	Residential Fuel - Distillate	10^4 gal
64 - 68	XXXXX	Residential Fuel - Residential	10^4 gal
69 - 73	XXXXX	Residential Fuel - Natural Gas	$10^7 ft^3$
74 - 77	XXXX	Residential Fuel - Wood	10^1 Tons
78	X	Action Code	-
79	A	Area Card Code	-
80	1	Area Card Code Number	-

Commercial, Institutional, and Industrial Fuel Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	-
3 - 6	XXXX	County Code	-
7 - 9	XXX	AQCR Code	-
10 - 14	XXXXX	Commercial and Institutional Fuel - Anthracite	10^1 Tons
15 - 19	XXXXX	Commercial and Institutional Fuel - Bituminous	10^1 Tons
20 - 24	XXXXX	Commercial and Institutional Fuel - Distillate Oil	10^4 gal
25 - 29	XXXXX	Commercial and Institutional Fuel - Residual Oil	10^4 gal
30 - 33	XXXX	Commercial and Institutional Fuel - Natural Gas	$10^7 ft^3$

Card Column	Format	Parameter	Units
34 - 35	XX	Commercial and Institutional Fuel - Wood	10^2 Tons
36 - 41	XXXXXX	Industrial Fuel - Anthracite	10^1 Tons
42 - 47	XXXXXX	Industrial Fuel - Bituminous	10^1 Tons
48 - 51	XXXX	Industrial Fuel - Coke	10^1 Tons
52 - 56	XXXXX	Industrial Fuel - Distillate Oil	10^4 gal
57 - 61	XXXXX	Industrial Fuel - Residual Oil	10^4 gal
62 - 66	XXXXX	Industrial Fuel - Natural Gas	10^7 ft^3
67 - 69	XXX	Industrial Fuel - Wood	10^2 Tons
70 - 73	XXXX	Industrial Fuel - Process Gas	10^7 ft^3
78	X	Action Code	-
79	A	Area Card Code	-
80	2	Area Card Code Number	-

Waste Disposal and Mobile Fuel Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	-
3 - 6	XXXX	County Code	-
7 - 9	XXX	AQCR Code	-
10 - 15	XXXXXX	Residential On-Site Incineration	10^1 Tons
16 - 20	XXXXX	Industrial On-Site Incineration	10^2 Tons
21 - 24	XXXX	Commercial and Institutional On-Site Incineration	10^2 Tons
25 - 30	XXXXXX	Residential Open Burning	10^2 Tons
31 - 36	XXXXXX	Industrial Open Burning	10^2 Tons
37 - 42	XXXXXX	Commercial and Institutional Open Burning	10^2 Tons
43 - 49	XXXXXXX	Gasoline Fuel - Light Vehicle	10^3 gal
50 - 54	XXXXX	Gasoline Fuel - Heavy Vehicle	10^3 gal
55 - 59	XXXXX	Gasoline Fuel - Off Highway	10^3 gal
60 - 64	XXXXX	Diesel Fuel - Heavy Vehicle	10^3 gal
65 - 67	XXX	Diesel Fuel - Off Highway	10^4 gal
68 - 72	XXXXX	Diesel Fuel - Rail Locomotives	10^4 gal
73 - 76	XXXX	County Population	10^3 persons
77	X	Density Code	
78	X	Action Code	-
79	A	Area Card Code	-
80	3	Area Card Code Number	-

Mobile Source Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	-
3 - 6	XXXX	County Code	-
7 - 9	XXX	AQCR Code	-
10 - 13	XXXX	Military Aircraft	LTO - 10^2 cycles
14 - 18	XXXXX	Civil Aircraft	LTO - 10^1 cycles
19 - 23	XXXXX	Commercial (Air Carrier) Aircraft	LTO - 10^1 cycles
24 - 27	XXXX	Vessel Fuel used in County; Anthracite	10^1 Tons
28 - 31	XXXX	Vessel Fuel used in County; Diesel Oil	10^4 gal
32 - 36	XXXXX	Vessel Fuel used in County; Residual Oil	10^4 gal
37 - 40	XXXX	Vessel Fuel used in County; Gasoline	10^3 gal
41 - 46	XXXXXX	Evaporation - Solvent Purchased/year	Tons
47 - 51	XXXXX	Gasoline Marketed	10^5 gal
52 - 57	XXXXXX	Limited Access Roads, Measured Vehicle Miles	10^4 mi
58 - 63	XXXXXX	Rural Roads, Measured Vehicle Miles	10^4 mi
64 - 69	XXXXXX	Suburban Roads, Measured Vehicle Miles	10^4 mi
70 - 76	XXXXXXX	Urban Roads, Measured Vehicle Miles	10^4 mi
78	X	Action Code	-
79	A	Area Card Code	-
80	4	Area Card Code Number	-

Miscellaneous Source Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	
3 - 6	XXXX	County Code	
7 - 9	XXX	AQCR Code	
10 - 16	XXXXXXX	Vehicle Miles Traveled, Dirt Roads	10^3 mi
17 - 21	XXXXX	LTO, Dirt Airstrips	LTO cycles
22 - 26	XXXXX	Land Area Construction	10^3 acres
27 - 31	XXXXX	Rock Handling and Storage	10^3 Tons
32 - 38	XXXXXXX	Forest Fires - Area Burned	acres
39 - 41	XXX	Forest Fires - Quantity/ acre	T/acre
42 - 47	XXXXXX	Slash Burning (brush fires- areas burned)	acres
48 - 50	XXX	Slash Burning (brush fires- quantity burned)	T/acre
51 - 54	XXXX	Frost Control, number of orchard heaters	10^2 heaters
55 - 57	XX.X	Number of days heaters fired/ year	da/yr
58 - 61	XXXX	Structural Fires	fires/yr
62 - 67	XXXXXX	Coal Refuse Burning - Size of Bank	10^2 yd^3/yr
68 - 70	XXX	Number of Coal Refuse fires burning	fires/yr
78	X	Action Code	
79	A	Area Card Code	
80	5	Area Card Code Number	

Comment Card

Card Column	Format	Parameter
1 - 2	XX	State Code
3 - 6	XXXX	County Code
7 - 9	XXX	AQCR Code
10 - 77	A----A	Comments
78	X	Action Code
79	A	Area Card Code
80	6	Area Card Code Number

B.3 TRACE MATERIALS/HAZARDOUS POLLUTANTS SOURCE CARD FORMAT

Spaces	Format	Symbol	Description	Units
1 - 19	(Same identification codes used on original coding form)			
20 - 21	XX	Numerical	Year of Record	-
22 - 26	XXXXX	Numerical Code	Pollutant	-
27 - 29	XXX	Numerical Code	Primary Control Device	-
30 - 32	XXX	Numerical Code	Secondary Control Device	-
33 - 35	XX.X	Numerical	Collection Efficiency	%
36 - 42	XXXXX.XX	Numerical	Emission Estimate	T/yr
43	X	Numerical Code	Method of Estimating Emissions	-
44	X	Numerical Code	Emissions included in Emission Estimated on Card 4	-
45	X	Numerical Code	Chemical Form of Emissions	-
46 - 52	XXXXX.XX	Numerical	Allowable Emissions	T/yr
53	X	Numerical Code	Compliance Status	-
54 - 57	XXXX	Numerical Code	Compliance Schedule	yr/mo
58 - 63	XXXXXX	Numerical Code	Compliance Status Update	yr/mo/da

B.4 SOURCE CLASSIFICATION CODE CARD FORMAT

Source Classification Code Format

Card Column	Format	Parameter
1	I	SCC - Category I
2 - 3	II	SCC - Category II
4 - 6	III	SCC - Category III
7 - 8	IV	SCC - Category IV
9 - 10		Blank
11 - 27	A----A	Category I Name
28 - 44	A----A	Category II Name
45 - 61	A----A	Category III Name
62 - 78	A----A	Category IV Name
80	1	Card Number

Emission Factors Units Format

Card Column	Format	Parameter
1	X	SCC - Category I
2 - 3	XX	SCC - Category II
4 - 6	XXX	SCC - Category III
7 - 8	XX	SCC - Category IV
9 - 10		Blank
11 - 79	A----A	Source Units Name
80	2	Card Number

Emission Factors Cards Format*

Card Column	Format	Parameter
1	X	SCC - Category I
2 - 3	XX	SCC - Category II
4 - 6	XXX	SCC - Category III
7 - 8	XX	SCC - Category IV
9 - 10		Blank
11 - 19	XXXXXXXXX**	Emission Factor for Particulates
20 - 21	XX	Confidence Level for Particulates
22 - 23		Blank
24 - 32	XXXXXXXXX**	Emission Factor for SO_2
33 - 34	XX	Confidence Level for SO_2
35 - 36		Blank
37 - 45	XXXXXXXXX**	Emission Factor for NO_x
46 - 47	XX	Confidence Level for NO_x
48 - 49		Blank
50 - 58	XXXXXXXXX**	Emission Factor for HC
59 - 60	XX	Confidence Level for HC
61 - 62		Blank
63 - 71	XXXXXXXXX**	Emission Factor for CO
72 - 73	XX	Confidence Level for CO
80	3. . .N	Card Number

---

* There may be more than one card having this format if the number of factor classifications (pollutants) is greater than 5. In this case card number and factor number would increase accordingly.

** One of these positions should be used for a decimal point where necessary.

B.5 GEOGRAPHICAL CARD FORMAT

STATE CARD

Card Column	Format	Parameter
1 - 2	XX	State ID Number
53 - 73	A----A	State Name
80	1	File Number

EPA CARD

Card Column	Format	Parameter
1 - 2	XX	EPA Region ID Number
10 - 34	A----A	EPA Region Name
80	2	File Number

AQCR CARD

Card Column	Format	Parameter
1 - 3	XXX	AQCR ID Number
10 - 64	A----A	AQCR Name
65	X	AQCR Particulate Classification
66	X	AQCR Particulate single point emission significance
67	X	AQCR SO_2 Classification
68	X	AQCR SO_2 single point emission significance
69	X	AQCR NO_x Classification
70	X	AQCR NO_x single point emission significance
71	X	AQCR HC Classification
72	X	AQCR HC single point emission significance
73	X	AQCR CO Classification
74	X	AQCR CO single point emission significance
75	X	AQCR Photo-chemical Classification
76	X	AQCR Photo-chemical single point emission significance
80	3	File Number

COUNTY CARD

Card Column	Format	Parameter
1 - 2	XX	State ID Number
3 - 6	XXXX	County ID Number
7 - 8	XX	EPA Region ID Number
9 - 11	XXX	AQCR ID Number
12 - 16	XXXXX	County Area (mi^2)
53 - 80	A----A	County Name

APPENDIX C
POINT SOURCE DEFINITION

A point source is defined as any emitting point or plant/facility whose summation of emitting points totals 100 tons or more per year of any one of the five primary pollutants: CO, SO_2, NO_x, particulates, or hydrocarbons; or as any of the pollutant sources listed below, regardless of quantity of emissions.

A. Chemical Process Industries

1. Adipic acid
2. Ammonia
3. Ammonium nitrate
4. Carbon black
5. Charcoal
6. Chlorine
7. Detergent and soap
8. Explosives (TNT and nitrocellulose)
9. Hydrofluoric acid
10. Nitric acid
11. Paint and varnish manufacturing
12. Phosphoric acid
13. Phthalic anyhdride
14. Plastics manufacturing
15. Printing ink manufacturing
16. Sodium carbonate
17. Sulfuric acid
18. Synthetic fibers
19. Synthetic rubber
20. Terephthalic acid

B. Food and Agricultural Industries

1. Alfalfa dehydrating
2. Ammonium nitrate
3. Coffee roasting
4. Cotton ginning
5. Feed and grain
6. Fermentation processes
7. Fertilizers
8. Fish meal processing
9. Meat smoke houses
10. Starch manufacturing
11. Sugar cane processing

C. Metallurgical Industries

1. Primary metals industries
    - a. Aluminum ore reduction
    - b. Copper smelters
    - c. Ferroalloy production
    - d. Iron and steel mills
    - e. Lead smelters
    - f. Metallurgical coke manufacturing
    - g. Zinc
2. Secondary metals industries
    - a. Aluminum operations
    - b. Brass and bronze smelting
    - c. Ferroalloys
    - d. Gray iron foundries
    - e. Lead smelting
    - f. Magnesium smelting
    - g. Steel foundries
    - h. Zinc processes

D. Mineral Products Industries

  1. Asphalt roofing
  2. Asphaltic concrete batching
  3. Bricks and related clay refractories
  4. Calcium carbide
  5. Castable refractories
  6. Cement
  7. Ceramic and clay processes
  8. Clay and fly ash sintering
  9. Coal cleaning
  10. Concrete batching
  11. Fiberglass manufacturing
  12. Frit manufacturing
  13. Glass manufacturing
  14. Gypsum manufacturing
  15. Lime manufacturing
  16. Mineral wool manufacturing
  17. Paperboard manufacturing
  18. Perlite manufacturing
  19. Phosphate rock preparation
  20. Rock, gravel, and sand quarrying and processing

E. All Petroleum Refining and Petrochemical Operations

F. All Wood Processing Operations

G. Petroleum Storage (storage tanks and bulk terminals)

H. Miscellaneous

  1. Fossil fuel steam electric powerplants
  2. Municipal or equivalent incinerators
  3. Open burning dumps

I. Hazardous Pollutant Sources

APPENDIX D

EXAMPLE QUESTIONNAIRES

D.1 EXAMPLE COVER LETTER

Dear Sir:

The ______(agency or board)______ requests your cooperation in providing the information asked for on the enclosed questionnaire concerning the operation of your facilities. The data provided will be evaluated and translated into emissions of pollutants to the atmosphere and added to the total emissions from all sources in the __(study area)__. This source information will enable the __(agency or board)__ to develop air pollution control programs necessary for compliance with requirements of the Federal Clean Air Amendments of 1970.

This emission survey is being conducted under provisions of __(cite section of State Law)__. Information from this survey will not be used contrary to the confidentiality provision in __(cite section of State Law)__ or Sec. 114 (c) of the Clean Air Amendments of 1970 concerning the divulgence of methods or processes entitled to protection as trade secrets.

The questionnaire is separated into four sections: fuel combustion, refuse disposal, process losses, and stack data. Each section should be completed regardless of the magnitude or type of material handled, processed, or burned. In completing the questionnaire, give a different number to represent each source in Section I, II, and III and then give stack data opposite the same number or numbers in Section IV. If you require additional information or assistance, you may contact __(name)__ of this office, telephone ______________________.

We would appreciate the return of the questionnaire by __(date)__. Your cooperation and expeditious completion of the inventory forms are urgently requested.

D.2 INSTRUCTIONS FOR COMPLETING QUESTIONNAIRE

A. General Instructions

1. Please return questionnaire by __________.
2. All information is to be based on ______ data; if this is not possible, specify the base year used.
3. Complete all sections of the form that pertain to your firm.
4. The small letters in each column refer to the footnotes at the bottom of the page. Please utilize these in answering each section.

5. If emission rates are available from measurements or computations, they should be included in the appropriate columns, along with supporting data. If emission data are unavailable, the emission column may be left blank. In such case, emissions will be calculated by the staff based upon data supplied. Calculations and factors utilized in determining final emissions will be forwarded to the originator of each questionnaire upon request.

6. If there is more than one plant location, please indicate totals for each location.

7. If additional questionnaires are needed they can be obtained at the following location:

   ____

   ____

8. If you have any questions, please contact ____________ at Area Code ____________.

B. Specific Instructions

Section I - Fuel Use

1. This section refers to the total amount of fuel consumed on the premises. List the quantities of fuel consumed as designated by footnotes. If there is more than one plant location, list fuel consumption for each location.

2. When estimating the percentage of fuel consumed for process heat, include power generation in the category.

3. Column E should be completed regardless of the type or quantity of fuels consumed.

Section II - Refuse Disposal

1. This section refers to the total quantity of refuse generated on the premises. Please estimate the amount of refuse produced regardless of the method of disposal (Column B).

2. If off-site disposal is used, please indicate name of hauler and location of disposal site.

Section III - Process Emissions

1. This section refers to the quantity of material processed or used to produce the items manufactured by your establishment and includes emissions from liquid storage facilities.

2. Please indicate in Columns A, B, and C, the types of processes, the types of materials used in these processes, and the amounts of these materials

utilized on an annual basis; for example, the amounts of limestone, sand, coal, and blast furnace dust used to produce cement.

3. Any process descriptions, equipment types, flow charts, etc. that will assist in calculating process losses should be included.

4. In Column E, list total flow rate for stacks and vapor losses for storage facilities.

Section IV - Stack Data

1. This section refers to any stacks which vent emissions from any source listed in Sections I through III above.

2. Please list all stacks on the premises and identify which sources are vented from the stack in the column titled "Sources Vented."

3. If test values are not available, please show design, calculated, or estimated values and indicate as such.

Additional Information

In addition to the information requested in Sections I and III, please write the following information on the back side of the questionnaire.

1. Fuel Use
    a. Average fuel use in gallons or cubic feet per hour
    b. Maximum fuel use in gallons or cubic feet per hour
2. Material Process Rate
    a. Average material process rate in pounds, tons, or gallons per hour
    b. Maximum material process rate in pounds, tons, or gallons per hour

Return To:

D.3 AIR POLLUTANT EMISSIONS SURVEY

Information is to be representative of Calendar Year

FOR OFFICE USE ONLY
Received By:
Reviewed By:
County
SIC Number
Coordinates

Firm name ______
Person to contact regarding this report ______ Title ______ Phone ______
Mailing address ______
Plant address ______
Nature of business (Products) ______
Employees at plant location ______ If seasonal, give range ______ Approximate land area at plant location ______

SECTION 1 – FUEL USE FOR GENERATION OF HEAT, STEAM, AND POWER

Normal operating schedule ______ Hours per day ______ Days per week ______ Weeks per year ______
Seasonal and or peak operation period (Specify) ______
Estimate of percent of total fuel consumed to provide space heat ______

	A	B	C	D	E	F	G	H	I	J	K	L
				Fuel data (D)					Air cleaning equipment		Estimate of contaminants (M)	
Source No.	Size of unit (input) (B) 10⁶ Btu/hr	Type unit (C)	Installation Date	Type fuel (E)	Amount per year (F)	Heat content (G) Btu	Percent sulfur (G,H)	Percent ash (coal only) (G,I)	Type (I)	Efficiency (J) %	Type (K)	Quantity (L)

SECTION II – REFUSE DISPOSAL

Refuse disposed of ______ On site ______ Off site – Location of disposal site and or name of hauler ______
Normal on site combustion operating schedule ______ Hours per day ______ Days per week ______ Weeks per year ______
Seasonal and or peak operation period (Specify) ______

	A	B	C	D	E	F	G	H
	Waste material						Estimate of contaminants (M)	
Source No. (A)	Type (N)	Amount per year (F)	Method of disposal (See Code Page 2)	Incinerator capacity, lb/hr	Auxiliary fuel used (O)	Type and efficiency, air cleaning equipment (I,J)	Type (K)	Quantity per year (L)

L-F

USE ADDITIONAL SHEETS IF NECESSARY

Reproduced from best available copy.

SECTION III – PROCESS EMISSIONS

Normal operati[illegible] ________ Hours per day ________ Days per week ________ Weeks per year ________

Seasonal and [illegible] period ________

NOTE: For inter[illegible], indicate approximate frequency and duration so that estimates of yearly emissions may be obtained.

	A	B	C	D	E	F	G	H	I
Source No.[a]	Processes or operations[illegible]	Installation Date	Materials [illegible] used and/or [illegible] of operations		Quantity of gas [illegible]	Type and efficiency air cleaning equipment [illegible]	Estimate of contaminants[m]		Basis of estimate[m] Please specify basis
			Type[illegible]	Quantity per year[illegible]			Type[m]	Quantity per year	

[a] [illegible] to represent each source and then give stack data opposite the same number on Section IV.

[b] [illegible] are sufficient.

[c] [illegible] cyclone furnace, pulverized, wet or dry bottom with or without fly ash reinjection, rotary or gun-type oil burner, etc.

[d] [illegible]

[e] [illegible] No. 1, 2, 4, 5 or 6 fuel oil, natural gas, LPG, refinery or coke oven gas, wood, etc.

[f] [illegible] tons, [illegible] per year.

[g] [illegible] name and address of fuel supplier.

[h] [illegible] weighted average.

[i] Cyclone, [illegible] settling chamber, etc.

[j] Please state if efficiency is [illegible] operating efficiency.

[k] Fly ash, [illegible] chemical description.

[l] [illegible] tons per year.

[m] Give stack test data if available, or otherwise specify basis used.

[n] [illegible] wood chips or sawdust, etc.

[o] Indicate whether auxiliary fuel is used in incinerators and pit burning, and the amount.

[p] Sulfuric acid-chamber, aluminum smelting crucible furnace, iron melting cupola, cement manufacture dry process, solvent cleaning, or other (please specify).

[q] Acid produced, tons, metal charged or processed, tons, cement produced, bbl., solvent consumed, gallons, etc., per year.

[r] Process material balance studies, field tests by plant or by equipment manufacturers, or other basis.

[s] List sources Sections I, II, III which utilize each stack.

METHOD OF DISPOSAL CODE
1. Open burning dump.
2. Sanitary landfill (no burning).
3. Burned in boiler or furnace.
4. Incinerator, single chamber.
5. Incinerator, multiple chamber.
6. Incinerator, rotary.
7. Conical metal burner.
8. Other (Specify)

SECTION IV – STACK DATA

SOURCES VENTED[s]	HEIGHT (Feet)	INSIDE DIAMETER (Feet)	EXIT GAS		
			Temperature of	Velocity (FPS)	Moisture (%)

Any supplemental material or data considered pertinent (flow diagrams, reports, summaries, test results, maps) should be submitted with this form.

Date

Name and title of official submitting reports

USE ADDITIONAL SHEETS IF NECESSARY

D.4 CRUDE OIL DRILLING, NATURAL GAS, AND LPG FACILITIES

Return to:

DATA FOR YEAR ______

OFFICE USE ONLY
Rec'd by: ______
Reviewed by: ______
County: ______
Coordinates: ______
SIC No.: ______

I. General Information

A. Company Name ______

Plant Address ______ City ______ State ______

Mailing Address ______ City ______ State ______

B. Person to contact about this form ______

Telephone ______ Position ______

C. Operating Schedule: other than continuous operation, please specify

______

II. Process Information

A. Drilling Operations: Type of well (natural gas or crude) ______

Quantity pumped (bbl, gal, cu. ft. per yr.) ______

Oil ______ Water ______

Casing-head gasoline ______ Sulfur content of crude ______

Amount Flared ______ H_2S Content ______

Sump Loss ______ (bbl, gal per yr.)

B. Crude Handling and Storage

Amount transferred to storage ______ (bbl, gal per yr.)

Type storage tanks (floating or fixed-roof) ______

No. of Tanks ______ Height ______ (ft.) Diameter ______ (ft.)

Sump Loss ______ (bbl/yr.)

C. Natural Gas Operations and LPG Plants

Cu. ft. processed/yr. (compressed, absorbed, etc.) specify processes

______

Fuel burned/yr.: In boilers ______ In Gas Engines ______

Boiler Capacity (BTU/Hr) ______ Stack Height (ft.) ______

Dia. (ft.) ______ Exit Vel. ______ (ft/sec) Exit Temp. ______ °F

NOTE: Fill out separate questionnaires for each location

D.5 CONCRETE BATCH PLANTS

Return to:

DATA FOR YEAR ____

OFFICE USE ONLY
Rec'd by: ____
Reviewed by: ____
County: ____
Coordinates: ____
SIC No.: ____

I. General

A. Company Name ____

Plant Address ____

City ____ Zip Code ____

B. Person to Contact

Name ____

Position ____

Telephone No. ____

C. Average number of Employees ____

D. Operating Schedule

____ Hrs/Day (if seasonal, give range)

____ Days/Year

II. Process Information

A. Amount Produced During Year ____ (tons) or ____ (cubic yards)

B. Control Equipment

Type ____

Efficiency ____ %

Installation Date ____

D.6 CONICAL BURNERS

Return to:

DATA FOR YEAR_____

OFFICE USE ONLY
Rec'd by:____________________
Reviewed by:____________________
County:____________________
Coordinates:____________________
SIC No.:____________________

I. General

A. Name____

Burner Location____________________________________

City______________________________Zip Code__________

B. Person to Contact

Name____

Position ____________________Telephone No. __________

C. Operating Schedule

____________________Hrs/Day (if seasonal, give range)

____________________Days/Year

II. Process Information

A. Burner Data

Base Diameter____________________Top Diameter__________

Height____________________Top Screen Size__________

B. Firing Data

Percent Excess Air____________________Exit Gas Temp. __________

Type Overfire ____________________(Tangential or Radial)

Method Charge ____________________(Bulldozer, conveyor or other)

C. Waste Information

Type	Amount (Tons/Year)
Municipal Refuse	____________
Sawdust	____________
Planer Shaving	____________
Bark	____________
Other (please specify)	____________

III. Control Equipment

Type____________________Percent Efficiency____Installation Date________

D.7 SAWMILLS

Return to: DATA FOR YEAR____

OFFICE USE ONLY
Rec'd by: ____________
Reviewed by: ____________
County: ____________
Coordinates: ____________
SIC No.: ____________

I. General

A. Name of Company____________________

Plant Address____________________

City____________ State________ Zip______

B. Person to Contact____________ Position__________

Telephone No.______________

C. Operating Schedule__________ Hrs/Day________ Days/Year

II. Process Information

A. Dust Producing Operations

1. Amount/Year (Tons) processed in each step:

Debarking __________

Cutting __________

Planing __________

Other __________

2. Is a burner used at this site? Yes ☐ No ☐

If yes, give amount burned/year (Tons)______, and:

a. Date of Installation______________

b. Burner Data: Base Dia. (ft.)______ Top Dia. (ft.)______

Height (ft.)______ Top Screen Size______ Capacity______

c. Firing Data: % Excess Air______ Exit Gas Temp.°F______

Type Overfire - tangential or radial

Method of Charge - Bulldozer, conveyor, or other

d. Control Equipment: Type____________________

Percent Efficiency ________ Date of Installation______

D.8 PEANUT PROCESSING

Return to:

DATA FOR YEAR____

OFFICE USE ONLY
Rec'd by:____
Reviewed by:____
County:____
Coordinates:____
SIC No.:____

I. General

A. Company Name____

Plant Address____City____Zip____

B. Person to Contact____Position____Telephone No.____

C. Average Number of Employees____

D. Operating Schedule____Hrs/Day____Days/Year

II. Process Information

A. Use: Type____Amount____

Control Equipment____Efficiency____%

B. Process

Type of Process	Amount Processed (Tons)	Control Equipment	% Control	Installation Date
Roaster, direct-fired				
Roaster, indirect-fired				
Shelling				
Blanching				
Other				

D.9 COTTON GINNING

Return to:

DATA FOR YEAR____

OFFICE USE ONLY
Rec'd by:
Reviewed by:
County:
Coordinates:
SIC No.:

I. General

A. Company Name__________

Plant Address__________

City__________ Zip Code__________

B. Person to Contact

Name__________

Position__________

Telephone No.__________

C. Average Number of Employees__________

D. Operating Schedule

__________Months of Operation (Jan., Feb., etc.)

__________Hrs/Day

__________Days/Year

II. Process Information

A. Bales of Cotton Ginned During Year__________(500 lb. bales)

B. Gin Trash Disposal

Open Burning ________(tons)

Land Fill ________(tons)

Composted ________(tons)

Hauled Off ________(tons)

Other ________ ________(tons)

C. Control Equipment

Type__________

Efficiency__________%

Installation Date__________

D.10 ASPHALT BATCH PLANTS

Return to:

DATA FOR YEAR______

OFFICE USE ONLY
Rec'd by:____________________
Reviewed by:____________________
County:____________________
Coordinates:____________________
SIC No.:____________________

I. General

A. Company Name______________________________

Plant Address______________________________

City______________________Zip Code______________

B. Person to Contact

Name______________________________

Position______________________Telephone No.______________

C. Average Number of Employees______________________________

______________________Hrs/Day (if seasonal, give range)

______________________Days/Year

II. Process Information

A. Amount of Asphalt Produced During Year______________(Tons)

B. Control Equipment on Dryer

Equipment Type	% Efficiency	Installation Date
Precleaner		
Cyclone		
Scrubber		
Centrifugal		
Orifice Type		
Baffle Spray Tower		
Bag House		
Other		

C. Fuel Use

Type______________________________Amount______________

D.11 GRAIN HANDLING

Return to:

DATA FOR YEAR ____

OFFICE USE ONLY
Rec'd by: ____
Reviewed by: ____
County: ____
Coordinates: ____
SIC No.: ____

I. General

A. Company Name ____
Plant Address ____
City ____ Zip Code ____

B. Person to Contact
Name ____
Position ____
Telephone No. ____

C. Average Number of Employees ____

D. Operating Schedule
____ Hrs/Day (if seasonal, give range)
____ Days/Year

II. Process Information

Tons/Year

A. Terminal Elevators
1. Shipping or Receiving ____
2. Transferring, Conveying, etc. ____
3. Screening and Cleaning ____
4. Drying ____

B. Country Elevators
1. Shipping or Receiving ____
2. Transferring, Conveying, etc. ____
3. Screening and Cleaning ____

C. Grain Processing
1. Alfalfa Dehydrating ____
2. Alfalfa Meal Milling ____
3. Corn Meal ____
4. Soybean Processing ____
5. Malted Barley or Wheat Cleaner ____
6. *Milo Cleaner or Rice Dryer ____
7. *Barley Flour or Rice Milling ____
8. Wheat Milling ____

D. *Feed Manufacturing ____

E. Control Equipment
1. Type of Dust Collector(s) (Specify separately for each process with emissions) ____
2. Design Efficiency ____
3. Quantity Retained in collector(s) ____

*Specify which

D.12 PETROLEUM REFINING

Return to:

DATA FOR YEAR ________

OFFICE USE ONLY
Rec'd by: ________
Reviewed by: ________
County: ________
Coordinates: ________
SIC No: ________

I. General Information

Firm Name ________

Person to Contact ________ Title ________ Telephone ________

Address of Plant ________ City ________

Mailing Address ________ City ________ Zip ________

Amount of Crude Processed ________ Barrels/Year. Plant Capacity ________ Barrels/Day.

Employees at Plant Site ________. Land Area at Site ________.

Normal Operating Schedule ________ Hours/Day ________ Days/Year

Type of Sulfur Recovery System ________. Amount Removed ________. Method of Disposal ________

II. Fuel Use for Generation of Heat, Power, Steam

A	B	C	D	E	F	G	H	Stack Data		
Source Number	Size Unit (input) 10^6 BTU/Hr	Installation Date	Type Fuel	Amount Per Year	Heat Content	Percent Sulfur	Height Ft.	Dia Ft.	Exit Velocity fps	Exit Tmp°F

III. (a) Process Information

Number	Process or Operation Releasing Contaminants To Atmosphere	Materials Processed and/or Used at Operation		Control Equipment		
		Type	Quantity/Year	Type	Instal. Date	Efficiency
101	Catalytic Cracking Unit Type ____________	Fresh Feed	________Barrels			
102	Cooling Towers	Cooling Water	________10^6 Gals			
103	Vacuum Jets	Vacuum Feed	________Barrels			
104	Process Drains	Waste Water	________Barrels			
105	Compressor Int. Comb. Engines	________Gas	________1000 Ft.^{3}			
106	Blowdown Systems	Emissions Will be Estimated from Plant Capacity				
107	Storage Tank Number Fixed-Roof______ Number Floating-Roof____	________10^3 Gal ________10^3 Gal	Total Capacity ________10^3 Gal ________10^3 Gal			

IV. (a) Emission and Stack Information for above Processes

Source No. of Process Above	Check Type				Stack Data				Emission Estimates (Tons/Year) to Atmosphere						
	Stack	Flare	Tank Farm	Fugitive Loss	Height (Ft.)	Dia. (Ft.)	Exit Velocity (fps)	Exit Temp °F	Particulates	Sulfur Oxides	Carbon Monoxide	Hydrocarbon	Nitrogen Carbon	Other	Basis of Estimate

★U.S. Government Printing Office: 1973--746-769/4169 Region No. 4